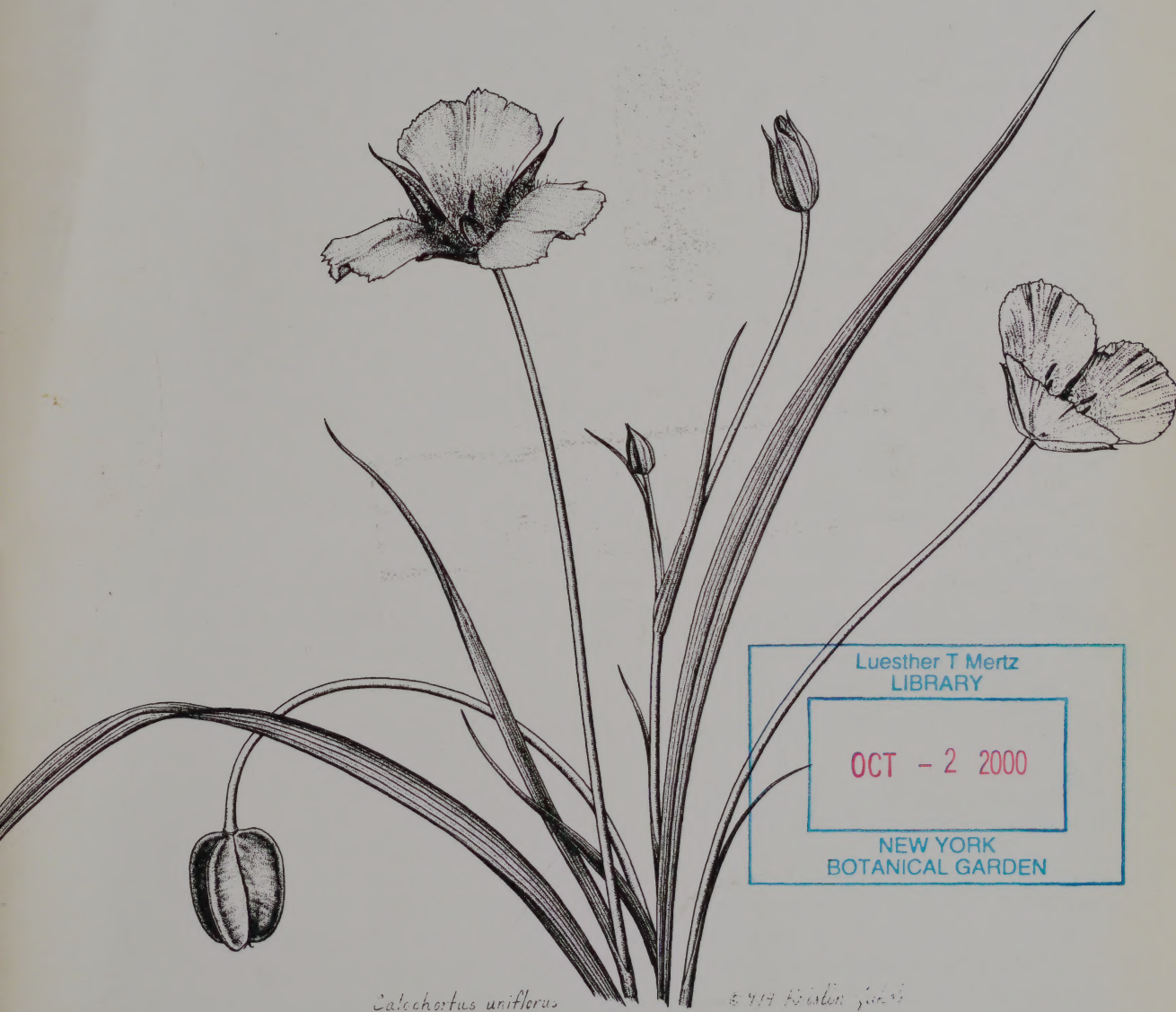


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BULBS

An International Bulb Society Quarterly



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BOTANICAL GARDEN

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BULBS

The quarterly publication of the International Bulb Society

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Propagation	Diana Chapman
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Do you have comments? We want to hear from you! Send comments to: BULBS - Editor,
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2000 MEMBERSHIP INFORMATION

Join the International Bulb Society! Member benefits: annual *Herbertia*, quarterly BULBS, semi-annual Seed Exchange (SX), educational website, book discounts, email Bulb Forum, and the Bulb Exchange (BX) (for members of the email Bulb Forum).

1 Year US	\$30.00
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Make payable to: IBS (in US funds only) and mail to: Dave Lehmler, Membership, 550 IH-10 South, #201, Beaumont, TX, 77707, USA. Email to: IBSMEM@aol.com

*If paying by credit card, enclose your card number (MasterCard or VISA only) and expiration date. Or you may apply online via secure server: WWW.BulbSociety.org

Join the IBS Email Bulb Forum!

Contact Robert Turley and simply ask to join the Bulb Forum: RMTurley@aol.com

In Memory of Bob Potterton

*The following obituary has been contributed by Herman van Beusekom,
a long-standing friend of Bob's from Holland.*

Bob died peacefully amidst his family on the 13th of January.

Fishing and bird-watching on the coast were two of his early hobbies, but his love for plants overtook this, and although he had no horticultural background he was already growing his first plants when 13 years old. He took a job in the docks in Grimsby, where he finally became a night manager, but his love of plants made him decide to start his own professional nursery. At first, he worked on the docks during the night and in his own nursery during the rest of the day, but soon he had bought a plot south of Grimsby where he could live and start his nursery.

Bob understood quite well that an effective nursery should be based on the quality and price of its plants and on innovation, so he built up an extensive collection of plants and bulbs from which he could start propagating. It is now, in fact, one of the biggest commercial collections in the country, known

throughout the world because of the extent of the collection and the fact that he was willing to ship plants abroad.

Over the years, Bob built up a large stock of Cyclamen, notably C. hederifolium 'White Nettleton Silver' and 'Pink Nettleton Silver'. He was one of the first to introduce named clones of Erythronium dens-canis. His collection of Calochortus and Fritillaria is unsurpassed in the country, but his own true loves were narcissi, especially the small ones.

It has always surprised me that Bob never gave lectures, although he could speak well and he was never short of new ideas. There must be lots of people around who can testify to this, having "talked plants" with him when sitting in a railway sleeper. Yes, I always came home fired again by his enthusiasm.

Bob is survived by his wife Jean, his daughter Elisabeth, and his son Robert, who, with the help of his wife, Jackie, is running the nursery now.

ATTENTION! IBS Membership Roster Imminent

Later this year IBS plans to publish its first membership roster! Many of us have been clamoring for a member roster for years and that day is at last upon us.

If you do NOT WISH TO BE LISTED in the roster, you MUST complete the form below. This form MUST be received on or before November 1, 2000, in order for your non-listing to be accepted and recorded.

Please note that NO PARTIAL LISTINGS will be accepted. You must agree to be listed, or NOT listed. If you wish to be listed, you need do nothing at all.

The roster will be distributed to bona-fide IBS members ONLY and the information contained in our membership database will NOT be given out, sold, or otherwise disclosed to any other commercial or private party or parties.

IBS MEMBERSHIP ROSTER REPLY

_____ By initialing here I hereby express my desire NOT to be listed in the IBS membership roster planned for publication in the latter part of 2000.

Name _____

Address _____

email address _____

Clip and mail to: Dave Lehmler, IBS - DEPT "R", 550 IH-10 South, Suite 201, Beaumont, TX, 77707, USA. This form MUST be received on or before 11/1/00.

EDITORIAL

Herbertia volume 54

First let me say that by the time you read this, I hope you will have already received this long-awaited volume. It is at the printer as I write.

You may be one of the IBS members who wonder why the "1999" Herbertia has been so long delayed. During early 1999 the IBS experienced a complete change in its board of directors. The old board members had served tirelessly and well for many years and thoroughly earned retirement from service.

Our current president, Robert Turley, was able to find willing volunteers to complete a new board of directors after some months. During the summer of 1999 we lost our brand-new editor, and a new one had to be found. In the fall of that year, our second editor resigned for personal reasons. By winter of 1999 we had found our third editor, Dr. Alan Meerow, who remains the current editor of Herbertia.

The Herbertia articles were thus moved from editor to editor, a slow and arduous task. There had been no formal writers' guidelines before the new board took their positions, and therefore the articles were received in a variety of formats. This situation required Dr. Meerow to rewrite nearly every article to make a publishable whole. In addition, it was necessary to find a new layout person and a printer as well.

There are also rewrites required, editing, proofreading, double-checking; publishing a journal is extremely complex. The publication of each issue of Herbertia involves a very high level of work and the time of many devoted members over the period of a year. When even one link in the chain fails, a year can easily be lost.

Dr. Meerow has presented us with a very large Herbertia in order to make up for the shortfall in timing. I think you will agree that it has definitely been worth the wait.

E-mail notices

E-mail is more and more commonplace, and IBS is currently compiling a list of all IBS members who have e-mail addresses. We will be using a master e-mail list to contact members about important news such as membership renewal, notice of registration for the annual IBS membership meeting, and local IBS group meetings. This will save IBS a lot of money otherwise spent on postage and will save the IBS board much time in preparing and mailing paper. This improved efficiency will help us to add more color to our publications and to continue to hold annual membership meetings with exciting, world-class speakers.

Second annual IBS members' meeting

Our second annual members' meeting will be held in Chicago the first weekend of May, 2001. Information on this spectacular event will be disseminated through our publications, our e-mail robin, and our IBS master e-mail list. Watch for details. Register early! Contact Cathy Craig at Batlette@home.com or call (949) 369-8588.

BULBS goes color!

Beginning with the next issue, BULBS will be a color publication. Since BULBS is a quarterly publication, you may expect the next issue in fall (in the northern hemisphere), or spring (in the southern hemisphere). Our feature articles will be "South African Bulbs" and "Asian Fritillaries." You will not be surprised to hear that the color photos will be superb and have been provided by the authors, Rachel Saunders and Dr. Jack Elliott. Make sure your membership is current. Check the address label on your copy of BULBS. You won't want to miss a single issue.

C Craig, editor

BULBS

Volume 2, Number 2

Summer 2000

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PHOTO CREDITS

We gratefully acknowledge the following persons who generously contributed their own photographs to this issue of BULBS: Kristen Jakob, Dr. Jack Elliott, Mary Sue Ittner, Jim Duggan, Jim Shields, and Kathy Andersen.

ADVERTISE IN BULBS!

If you have a small nursery (or not so small) consider advertising in BULBS. Our readers have demonstrated their wish to support businesses that advertise in The International Bulb Society publications.

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Ad Rates:	once	4 per yr @	Annual price	once	4 per yr @	Ann price
¼ page	\$60	\$50	\$200/4	\$75	\$65	\$260/4
½ page	\$100	\$82.50	\$330/4	\$140	\$120	\$480/4
Full page	\$160	\$132.50	\$530/4	\$280	\$240	\$960/4

To inquire about placing ads please see inside front cover this issue.

The opinions expressed by contributors in this publication are solely those of the individual writers and do not necessarily reflect the opinions of the editor, the board of directors, or of The International Bulb Society, Inc. (IBS) The IBS publishes paid advertisements as a service to its members but cannot be responsible for the quality of bulbs, geophytic plants, seeds, services, supplies, or other merchandise received, nor for guarantees expressed or implied.

The International Bulb Society, Inc., is a non-profit organization. Said corporation is organized exclusively for educational and scientific purposes; and especially to promote, encourage, and foster the horticulture, development, and improvement of bulbous or geophytic plants and public interest therein. These purposes are expressly limited so that IBS qualifies as an exempt organization under IRS code section 501 (c) (3).

March Cover Photo Contest: AND THE WINNERS ARE...

Thank you all who entered the cover photo contest in the previous issue of BULBS!

ANSWER: Chlorogalum pomeridianum. Please see the description and interesting history of this bulbous plant on page 9 of this issue.

WINNERS: Dylan Hannon and Elizabeth Lassanyi. Congratulations to you both!

PRIZES: We are awarding one year free extension of your membership in IBS.

COVER ARTWORK

Cover drawings were done by Kristin Jakob for publication in 2001 of *Wild Lilies, Irises and Grasses*; *California Monocots in the Garden*, by the California Native Plant Society. We express gratitude to the publisher for the use of these drawings.

EN GARDE!

By Roy Sachs

Beneficial Parasites & Predators vs Chemical Controls

Silent Spring, by Rachel Carson, was published in 1962, changing forever the rules applied to disease and pest control. The book is best remembered for documentation of the DDT-residue link to the demise of several bird populations. She also stated explicitly that the overuse of pesticides in commercial agriculture caused reduced populations of beneficial insects (the predators), and hence increased plant pest populations (the prey). That was my initiation into the biological control of pests. The subject has expanded over the intervening years and is now known as Integrated Pest Management (IPM).

IPM encompasses a combination of techniques: biological control, habitat manipulation, modification of cultural practices, and the use of resistant plant varieties. Pesticides are used only after monitoring indicates they are needed, and the goal is removal of only the target organism. Materials are selected and applied in a manner that minimizes risks to beneficial and non-target organisms.

Since the 1960s, predator insects, snails, nematodes, and bacteria have been made available to help control many of the worst garden and greenhouse pests. Charts matching pest or disease to control agent are published in many places, as well as costs and availability of the predators. For hard-nosed accounts of the successes and failures of biological controls, get the illustrated soft-cover books in the references listed at the end of this article. I have also listed web sites containing valuable information on beneficials and IPM in general.

What do we need to know first? A no brainer! We have to know what pests we want to control, and we do this by monitoring.

A simple and reliable way to monitor our pests is by using sticky yellow cards. These are about 4 in x 6 in (10cm x 15cm) and will attract and trap insects in the garden, nursery, or greenhouse. They are widely available and inexpensive. Tack or staple them to stakes (or hang them from fishing line in the greenhouse) about 1 ft or so (25+ cm) above the plants. You'll be pleasantly (or unpleasantly) surprised with the great number of insects that are stuck to them within a day or two (mine in Davis get mainly

house and/or horse flies).

For the past 3 years I have operated a mini-nursery along the Russian River, within 7 miles of the Pacific Ocean, where the climate is quite different from that of Davis. Hence I can compare what's stuck on my yellow cards to determine the insects flying or crawling among plants at the two locations. Although aphids and whitefly are quite common in Davis, they are rarely seen at the Russian River site. I do not know the reason for this difference, since the plants cultivated (and many of the weeds) are the same. But at the Russian River I find a reasonable population of lady beetles (also called ladybugs, species not identified) on most of the alstroemeria and weeds. Curiously they don't seem to go to the yellow cards. Lady beetles have an excellent reputation among biological control experts for being voracious consumers of aphids, and perhaps I've lucked into some marvelous timing of lady beetle appearance just ahead of the aphids, which keeps the latter to an insignificant level.

White fly, easily spotted on yellow cards, is a serious summer pest in Davis but not yet along the Russian River, so perhaps there is a parasitic wasp (*Encarsa formosa*) population that overwinters on the vegetation there. I'm not adept at identifying many insects, and the smaller they are the more difficult this becomes. Jean Natter suggests a hand lens, and then of course one must use it. The yellow cards keep the bugs immobile, so that problem is solved.

Climate counts when deciding what method to use. Proper use of biological agents requires attention to the climatic requirements and life cycles of both the pest and the predator. For example, let's say that we spot aphids on buds in the garden or greenhouse. A predatory midge (small fly) in the pupal stage can be released; within a week, if temperatures are at or above 21° C (70° F), adults will emerge and begin to prey on the aphids. Had I used this midge in my Davis, CA greenhouse, where temperatures were not above 15° C when an aphid infestation occurred on alstroemeria, I would have faced the problem of very slow maturation of the midge larvae, necessitating several releases of midges over 2 to 3 week

intervals. There may have been greater aphid damage than what I consider tolerable to the alstroemeria inflorescences. One spray with diazinon eliminated the mature aphids and a second spray about 7 days later took care of the problem completely. As a result, there are no or very few aphids or any other serious pests that I can spot on the monitoring yellow sticky cards.

The important point here is that the aphids "bloomed" at temperatures well below that required for the predator to become effective.

And cost? Cost is an important consideration too. For the 5000 sq. ft. greenhouse (ca. 500 sq. meters) over \$150 worth of midges would have been required, whereas the diazinon sprays cost less than \$0.75! The differential between the initial cost of biological agents vs. standard pesticides is not unusual and can be daunting.

What about snails and slugs? Surely the worst pests in my nursery and greenhouse, if left unchecked, are snails and slugs. There is a good predatory snail for the common garden snail, but it leaves slugs untouched! If I bought the predatory snail, I could not use slug poisons for the simple reason that they would also kill the predators.

The forum speaks. We have an active group of robineers who share their experiences in the fight against pests. The majority of contributors on mealy bug control suggested that some sort of poison, naturally occurring like nicotine sulfate, or synthetic like cygon or diazinon, was required to do the job, although no one reported on experience with a mealy bug predator, *Cryptolaemus montrouzieri*, which is available for sale.

Grubs (the crude generic name for soil inhabiting larvae of many insects) in lawns, on golf courses, and elsewhere have been controlled by predatory nematodes (good literature and robineer testimony on that)!

Concluding Anecdote: An Academic Experiment. Several years ago at the University of California, Davis campus, some entomologists took charge of an Environmental Horticulture greenhouse to see if they could maintain an appropriate balance between beneficial insects and pests. The goal was to eliminate damaging attacks on roses, gerbera, chrysanthemum, carnations, and other plants (using whiteflies, thrips, aphids, etc.) without recourse to pesticides. They did not succeed, perhaps because ventilation must be maintained in the greenhouse and the beneficials escaped. Consequently, the department uses pesticides

timed to the number of pests that are found on the sticky yellow cards. Don't get me wrong—biological control is preferred, just not practical in all cases!

References

Catalogs:

You will be able to order from these companies and get every biological control agent available.

Harmony Farm Supply and Nursery, PO Box 460, Graton, CA 95444. (707) 823-9125, FAX (707) 823-1734, e-mail: info@harmonyfarm.com

Peaceful Valley Farm Supply, 110 Spring Hill Dr., Grass Valley, CA 95945. [Http://www.groworganic.com](http://www.groworganic.com), (530) 272-4769

Applied Bio Pest, 3310 Net Place, Oxnard, CA 93035, (805) 984-9224, <http://www.biopest.com>

Books:

I like these illustrated soft-cover books:

Pub 3332, *A Grower's Guide to Using Less Pesticide: Pests of the Garden and Small Farm*, by Mary Louise Flint.

Pub 3386, *Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control*.

To order these books call: University of California Division of Agricultural Resources, (800) 994-8849, or University of California Press, (800) 777-4726.

Websites:

<http://rcwebserver.rutgers.edu/pubs/greenhouseipmnotes/>

<http://ucipm.ucdavis.edu/PMG/selectnewpest.floriculture.html>

<http://www.oardc.ohio-state.edu/nematodes/>

STARTING WITH SEED

by Diana Chapman

This first column will discuss some general principles, the understanding of which can be helpful when one sows seed from different regions. Bulbs come from an enormously wide range of environments, and their seeds have developed many different survival mechanisms to cope with the varying conditions they encounter. To be successful in growing bulbs from seed, therefore, it is necessary to try to understand what these survival mechanisms may be, and this is often no easy task.

THINK LIKE A SEED

When one starts to grow bulbs from seed, the usual source for the seed will be a society seed list, such as IBS, AGS, SRGC, or NARGS. Seed of some species of bulbs can also be purchased from a few large seed houses such as Chilterns, or small specialty seed suppliers such as Northwest Native Seed or Southwestern Native Seed. When your seed arrives, it will come without any instructions, and, in the U.S., just sowing it when you receive it in the hope that it will come up can be a lesson in frustration. Valuable seed may be wasted in this manner since the extreme heat of summer in many parts of the U.S. can present problems for seed and seedling survival if it is sown at the wrong time of year. I know of no reference book available that deals specifically with germinating bulb seed, and even many of the excellent books available about growing bulbs do not cover seed propagation in detail. Jack Elliott's article "Growing Bulbs from Seed" in an earlier issue of BULBS contains much valuable advice on this topic, and most of the monographs on bulbs also give specific instructions. What do you do, though, if you have some species that you can't find instructions for?

The most important factor in sowing bulb seed is understanding the climate and habitat where the bulbs originate. Consulting some of the many reference books available should at least tell you where your bulb would naturally grow, and from this you can extrapolate the conditions under which seed would be dispersed, and the environmental challenges it would face in germinating and surviving through the seedling stage. In other words, "think like a seed." What environmental conditions would seed

encounter in the Andes, the Cape Province of South Africa, or the Caucasus mountains? What strategies might have been developed to cope with the climatic conditions in each of these regions? An atlas of the world is an indispensable reference.

In Mediterranean climates, most bulbs grow through the rainy winter, bloom in the spring, and then shed their seeds, which lie exposed to very dry conditions until the winter rains return, at which time they germinate. Most of the Iridaceae of the western region of the Cape Province of South Africa behave in this manner, as do the low-elevation bulbs from the western United States. Such seeds germinate very readily and if given water can germinate at any time of year, but if sown in spring or summer and watered to induce germination, they may die in the heat of summer. It is essential, therefore, to sow such seeds when they will experience conditions as similar as possible to their natural environment, and this would be in the fall, when temperatures are dropping and cool conditions prevail.

The seed of alpine bulbs behaves differently. An example is *Erythronium grandiflorum*, which comes from the Mediterranean climate of California but is an alpine plant that grows at high elevations. This species blooms in spring, then sheds its seed in summer, but if the seed germinated right away in response to the moisture of frequent thunderstorm activity in the mountains, the seedlings would be killed by the severe cold of the next winter. Such seeds have developed germination inhibitors to prevent them sprouting at the wrong time of year. These are chemical substances that slowly break down under cold conditions, allowing the seed to germinate only in spring after several months of low temperatures. If these seeds do not experience the cold conditions needed to remove these chemical inhibitors, they absolutely will not germinate and eventually will die. One can assume that all seed of bulbs that come from climates with cold winters have such germination inhibitors, and they therefore need to be exposed to such conditions naturally by being sown outside in a cold-winter area. In mild-winter regions, germination can be induced by sowing the seed in moist conditions and keeping it under refrigeration until it

germinates.

Tropical bulbs grow in climates where moisture and temperature are much more stable, and, as a result, their seeds generally have not developed any techniques to delay germination. The seeds of these bulbs are usually short-lived, since, from an evolutionary standpoint, there has not been any need to produce a seed with an extended dormancy. These are the ones you can sow right away when you get them, since they will germinate promptly and have only a relatively short viability.

Australian geophytes are quite another matter, and germinating the seed of some of the most desirable species can be a challenge. Many Australian plants are adapted to fire, and will only germinate well after exposure to smoke or to fire itself. The exact mechanism of this is not completely understood, and research is being done on this at present. Bush fires in Australia, grassland fires in California, and veldt fires in South Africa have historically been frequent phenomena, and since all of these areas are rich in geophytes, it is not surprising that

many species have developed mechanisms to take advantage of the superior growing conditions that exist after fire has reduced competition and altered soil chemistry.

This touches very lightly on a few topics that illustrate the need to understand the geography and climate that different species of bulbs come from if we are going to be successful in germinating their seed.

Diana Chapman and Dave Lomba are the owners of Telos Rare Bulbs, a nursery located in northern California, USA.

As the name implies, it is a specialty nursery for rare and unusual bulbs. The catalog is divided into four parts: bulbs from the Western US, Central and South America, South Africa, and a miscellany of bulbs from other parts of the world.

In addition to the catalog being very organized, there is a contest inside, "Find the typo and win a free mystery bulb!!" It's always nice to have a little fun while perusing the goodies for sale.

Please see her advertisement elsewhere in this issue.

Mainly Amaryllids Garden

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plants_man@bigpond.com

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We produce two bulb lists each year
one in autumn and one in spring

Correction to Spring BULBS from David Fenwick

I feel obliged to correct an error that appeared in the article 'In Praise of Tulbaghia', in the spring 2000 edition of BULBS. I refer to my mention of Tulbaghia violacea 'The Pearl'; I am indeed in error and Luen Miller of Monterey Bay Nursery, Inc., who developed this bulb, have informed me that its name is just Tulbaghia violacea 'Pearl'.

She informs me that this variety was originally named 'Paarl' after the South African city, but because of problems with the name it was changed to 'Pearl'; paarl being Afrikaans for pearl. Since the change there have been further problems with the name, and its obvious association with the well known Achillea ptarmica clone called 'The Pearl'.

IBS GLOBAL REPORT

SOUTH AFRICA News

Two new species discovered at Nieuwoudtville South Africa

A couple of years ago, Rod and Rachel Saunders discovered a new species of *Romulea* near Nieuwoudtville, about 300 km north of Cape Town, in a very well collected area. Then last year, they found a new species of *Babiana* in the same area.

How do two new species manage to lurk undiscovered for so many years in an area that is visited by so many amateur and professional botanists each flower season? The reasons are fairly simple. In the case of the *Romulea*, the new species is yellow-flowered, and it grows in exactly the same area as *Romulea montana*, *monticola* and *hirta*, also all yellow-flowered species. Thus, to an observer the new species is almost indistinguishable. Rod and Rachel, because of their interest in seed collecting, need to identify species very carefully when they are in flower. So they potted along the road, stopping and digging up (and then re-planting) a *Romulea* corm every meter. The easiest method of identifying one *Romulea* from another is by corm shape. Suddenly they found a whole population of plants with a most peculiar corm shape—completely flat like a pancake! This corm shape has not previously been seen in *Romulea*, so they collected a few plants and took them to the Compton Herbarium at Kirstenbosch. Sure enough, it was a new species.

The *Babiana* discovery is even simpler. Usually the spring flowering

season in Nieuwoudtville extends from late July to early September, and most visitors go to the area during that period. However, the seed-collecting period extends well into December and sometimes even into January, so Rod and Rachel tend to be at Nieuwoudtville at unusual times of year. The new *Babiana* flowers late in September into October and November, and it was probably overlooked because there was no one there to see it! It is a distinctive species with large, mauve, unscented flowers with an extremely long tube.

If two new species can be found in an area that has been extremely well botanized, one wonders what other new species wait to be discovered in other areas.

UK News

Vincent Square one of the best RHS Spring Shows recently

As usual, there were many small stands with a predominance of early bulbs, especially *Crocus*, *Galanthus*, *Cyclamen*, and *Narcissus* species. A magnificent collection of more than forty different snowdrops, beautifully arranged to give an impression of a woodland setting, was awarded a Gold Medal. One or two that caught my eye because they were so distinct were *G. plicatus* 'Wareham' with huge flowers and almost entirely green inner tepals; *G. nivalis* 'Viridapicis', an old favorite with the obvious distinction of having green tips to the outer tepals; and 'Mighty Atom', with very large flowers, some three times the length of their pedicels. The experts seem to be arguing constantly about the last, but it appeared to match the name well. For the lover of the curious, there was 'Walrus', which had extremely long, narrow outer tepals, with green almost over the outer half. I understand it is uncommon.

On Potterton & Martin's exhibit I was very smitten by *Narcissus romieuxii* 'Treble Chance', apparently quite a good grower and having a beautiful flat corona like 'Julia Jane' and 'Joy Bishop'. They were also showing the superb *Iris histrioides* hybrid 'Sheila Ann Germaney'. This has some resemblance to the very popular 'Katharine Hodgkin', which is probably of similar parentage, but it is not the same peculiar mixture of blue and yellow that offends some gardeners. This was a wonderful shade of pale blue with hardly a hint of yellow. If only it will grow and increase like 'Katharine Hodgkin', what a wonderful addition to the early garden it will be! It was good to see an early *Fritillaria* species, a good clump of *F. stenantha*, one of the *Rhinopetalum* group, characterized by the deep nectaries at the base of the segments which protrude conspicuously from the back of the flowers. The plants shown were about 20cm (8in) high, with glaucous leaves and several pale pink flowers with rather narrow segments recurving toward their tips. They are quite easy under glass and might grow outside where summers are drier.

An unexpected exhibit at this season was a striking group of Peter Smith's magnificent Princess strain of alstroemerias, which seem

to be way ahead of any others for cutting and are proving unexpectedly successful in the garden. The range of colors and markings is huge, and new cultivars appear every year. They are not very suitable for shipping overseas, but he is hoping eventually to grow them in the States.

The Awards Committee saw a plethora of beautiful snowdrops, but the few *Crocus* species and a solitary *Hyacinthella* created more interest (at least for your reporter). *Crocus paschei* is not often seen. It has very large, very pale blue flowers with a yellow throat and no markings on the outside. The colour was extremely pale, in contrast to that of *Crocus pelistericus*, which had very dark violet-blue flowers, even darker on the outside of the segments, a superb color. This species grows in very wet situations in northern Greece and surrounding mountains, and it needs to be kept moist throughout the summer.

Hyacinthella glabrescens is not widely grown but would make a good addition to our gardens, with 5cm racemes of darkest violet-blue flowers on long pedicels. It is another bulb that will almost certainly benefit from fairly dry conditions in summer.

This fine early show will be little more than a memory when this report appears in print, but the time for buying new bulbs is fast approaching, and I hope it will give some new ideas for bulb growers' 'wants lists'.

COVER PHOTO

of March 2000 BULBS

Chlorogalum pomeridianum is a bulb found on grassy road banks, open meadows, and slopes in southern Oregon and California. It has basal rosettes of attractive wavy- margined leaves that appear late winter, and widely branched panicles of fragrant flowers that bloom in summer on stems to 2 1/2 ft. (76 cm.) The flowers open in late afternoon, are pollinated by night-flying insects, and fade by morning. Flowers appear over a long period. All parts of this plant were used by native Americans in a variety of ways: they used the lather from the crushed bulb for bathing, washing clothes, and as a shampoo. From this use comes the common name, Soap Plant.

For the winners of the contest, please see bottom of page 3 this issue.

CROSS REFERENCE OF ADVERTISERS WEB SITES:

- Cherry Creek Daffodils – Steve Vinisky: www.europa.com/~stevev.main.html
Flowers and Greens – Roy Sachs: <http://alstroemeria.hypermart.net>
Mainly Amaryllids – Daryl Geoghegan: www.users.bigpond.com/plants_man/home.htm
Odyssey Bulbs – Russell Stafford: www.odysseybulbs.com
Silverhill Seeds – Rod & Rachel Saunders: www.silverhillseeds.co.za
www.rareplants.de – Bjorn Malkmus: www.rareplants.de

um Amorphophallus Anchomanes Anthericum Arisaema Arum Asphodeline Asphodelu
chychilum Bulbinella Calla Calochortus Camassia Cardicrinum Clivia Colchicu
nvallaria Corydalis Crocus Cyclamen Dierama Dracunculus Eranthis Eucomis Fritillaria
diolus Gynandris Hemeranthus Hemerocallis Hosta Hacinthoides Hyacinthus Ipheion Iri
phofia Leucojum Lysichiton Muscari Narcissus Ornithogalum Oxalis Pancratium
adisea Paris Polygonatum Puschkinia Romulea Scilla Trillium Triteleia Tulipa Urginea
atrum Wachendorfia Watsonia Zantedeschia Allium Amorphophallus Anchomane
hericum Arisaema Arum Asphodeline Asphodelus Bulbinella Calla
lochortus Camassia Cardicrinum Clivia Colchicum Convallaria Corydalis Crocu
clamen Dierama Gladiolus Gynandris Hemeranthus Hemerocallis Hosta Hacinthoides Hyacinthus Ipheion Iris Kniphofia Leucojum
um Lysichiton Muscari Narcissus Ornithogalum Oxalis Pancratium Paradisea Pari

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CALOCHORTUS:

Treasures of the American West by: Diana Chapman

Of all the bulbs native to the USA, the genus *Calochortus* must be the most beautiful, whether your concept of beauty is that of the brilliant colors and elegant form of the Mariposa lilies, or the intricacy and diminutive charm of the furry little Cat's Ears, these being but two of the many forms this beautiful genus encompasses.

Calochortus are found across Western North America, from the foggy bluffs of the Pacific Northwest, to the snow fields of the Sierra Nevada mountains of California, through the austere beauty of the high intermountain regions of Nevada and Utah known as the Great Basin, the vast Southwestern deserts, and, finally, into that flower heaven known as the Rocky Mountains. As if this weren't enough, there are many species from the subtropical regions of Mexico, thus encompassing an extraordinarily wide range of habitats, climates and microclimates. If your heart is set on growing *Calochortus*, you almost certainly can, wherever you live, by choosing from the more than 60 species those most in accord with the conditions you have to offer.

The botanical classification of the genus *Calochortus*, with its Sections and Subsections can be somewhat confusing for those encountering these lovely bulbs for the first time, and, since this article is intended as an introduction to growing *Calochortus*, the following more descriptive approach will be given, grouping the genus into three main categories.

Mariposa lilies

These are tall, graceful plants with large, upward facing bowl-shaped flowers that come in a spectacular range of colors. Many species have hairy petals and intricate petal markings that add great beauty to the flower.

Star Tulips and Cat's Ears

These are usually small plants with petals that are smooth (Star Tulips), or densely covered with silky hairs (Cat's Ears). Whoever coined the common name "Cat's Ears" could not have chosen a more suitable term, since the hairy petals look exactly like the inside of a cat's ear.

Fairy Lanterns (or Globe Tulips)

The pendulous, globe-shaped blooms of this group hang down from the stem, quite unlike the other species. Although taxonomically different from the Fairy Lanterns, most Mexican species also have similar pendant flowers.

Mariposa Lilies

The beautiful Mariposas are generally plants of grasslands, being most abundant in the foothill regions of the Sierra Nevada and Coast Range, as well as the Tehachapi mountains and Transverse Ranges of Southern California, but this group also includes several alpine species as well as all those native to the deserts.

Calochortus luteus

The most widespread of all, and one of the easiest to grow, with its lovely upward facing deep yellow flowers, variably marked with chestnut brown inside. It is extremely easy to grow, even tolerating intermittent summer water.



C. clavatus

A Southern California species with very large golden yellow flowers, the inner petals being densely covered with hairs. With its sturdy, zig-zag stems, this *Calochortus* never needs support.

C. vestae

A lovely North Coast Range species with huge flowers appearing late in the spring, white tinted and streaked purple with beautiful inner markings. This species increases very vigorously by bulbils, and is one of the easiest to grow.

C. superbus

Another widespread species, the Sierra Nevada foothill form being pure white with a purplish-brown blotch at the base of each petal surrounded by bright yellow. The Coast Range variety is usually tinted lavender.

C. kennedyi

The gorgeous desert Mariposa with vermilion flowers, but tantalizingly difficult in cultivation.

C. venustus

This is everyone's favorite, since it has the greatest color range of any *Calochortus* species. The huge bowl-shaped flowers range from purest white to all shades of yellow, pink, purple and the deepest crimson. Most of the Mariposas have a basal spot to the petal, but *C. venustus* has an echo spot above it much larger than the basal spot, and often beautifully colored. *C. venustus* is found in both the Coast Range and the Sierra Nevada in about the lower two thirds of the State of California, with the more colorful ones concentrated in the southern part of its range.



C. gunnisonii

The one species that comes from the Rocky Mountains, it spends months under deep snow, and has large jewel-like flowers of purple and white, with the lower third of the petals covered with bright yellow hairs.

These are only a few representatives of the Mariposas, since there are far too many to list here, but you may be assured that they are all exquisite.

Star Tulips and Cat's Ears

Many of these species grow at slightly higher elevations than the Mariposas, although *C. tolmiei* can be found on coastal bluffs that drop down to the surf, as well as at elevations up to 5,000 ft. in the Coast Range and Sierra Nevada.

C. tolmiei

This species has lavender petals, completely covered with silky white hairs. The coastal variety has deep purple centers.



C. monophyllus

Found growing in the shade of shrubby thickets in the Sierra Nevada, it is deep yellow, sometimes with a dark basal spot to the petal.

Both *C. tolmiei* and *C. monophyllus* are small plants, ideally suited to the rock garden or to container culture, where their intricate beauty can be admired close up.

C. uniflorus

Representative of the Star Tulips, with petals that are largely hairless (there are SOME hairs, but you have to look close!), with lavender-pink satiny petals, and deep lavender anthers this species is one of the easiest to grow, blooming very early and continuing throughout the spring. It even tolerates summer water, although its native habitat dries out completely in summer. For the beginner, this is a great plant, which also has the endearing habit of increasing vigorously by numerous bulbils.

Other Star Tulips include *C. umbellatus*, *C. nudus* and *C. minimus*.

Fairy Lanterns (or Globe Tulips)

These enchanting species are usually found growing in light shade on sloping banks, and are characterized by their graceful, dangling "lanterns", many to a stem.

Calochortus albus

Found in the Coast Range, as well as the Sierra Nevada, this species is a translucent pearly white, although red varieties are also common, the red hue varying from rusty tints to a beautiful deep purple-red, the latter commonly known as *C. albus* v. *rubellus*.



C. amoenus

A most beautiful rose pink, this species comes from the foothills of the central Sierra Nevada.



C. pulchellus

From Mount Diablo near the San Francisco Bay Area, it is also yellow with larger flowers.

C. amabilis

From the Coast Range, it is bright yellow with fringed petals, commonly known as "Diogenes' Lantern".

C. raichei

Yellow with very glaucous foliage, this is a newly described species.

Mexican species

Since the Mexican species of *Calochortus* are summer growers, they are much better

suited to the Southern States of the US, as they not only tolerate, but thoroughly enjoy, the hot, humid summers. They do need to be kept somewhat dry in winter, and they are not particularly frost tolerant. Most have drooping flowers similar to the Fairy Lanterns, but often with a more bell-shaped form. They come in a range of sultry colors.

C. barbatus

With a very wide range in Mexico, this has very hairy pendulous flowers in a dusky reddish brown.

C. nigrescens

This species, as its name implies, is almost black.

C. spatulatus

Another widespread species in Mexico, with dusky purplish bells. This one produces bulbils at the base of the leaves, and is so easy to grow that in the right environment it could become a weed!

Growing Calochortus

Since most *Calochortus* species come from Mediterranean-type climate of the western USA, they grow during the cool, rainy winters, bloom mid to late spring, and are dormant in summer when they must be kept dry. The exceptions are the high altitude species (such as *C. leichtlinii* and *C. gunnisonii*) which are dormant in winter, emerging soon after the snows melt to bloom from mid to late summer. The alpine species generally need cold conditions in the winter and cool summers, but, since their growth cycle is in summer, they do need summer water. The Mexican species are also dormant in winter, when they should be kept on the dry side, and grow during the summer too, blooming in late summer or fall. They can tolerate a much warmer summer than the alpine species for most are from subtropical regions.

Bearing this in mind, therefore, it is absolutely essential to know what sort of region your *Calochortus* come from if you are going to be able to grow them successfully. This is not too difficult, since there are some excellent reference books available, such as **The Jepson Manual - Higher Plants of California**, and **A California Flora** by Munz, both published by the University of California Press (although Munz is outdated, the descriptions are more complete and easier to read). In addition, the main suppliers of *Calochortus* seed describe in some detail the locality where the seed was collected. The most important facts you need to know are whether the *Calochortus* species you are

thinking of growing are winter growers, summer growers, alpine or desert species.

If you are new to growing *Calochortus*, you may wish to purchase bulbs to get started. This can be great fun, for if you live in a part of the country (or world) where *Calochortus* are not native, and you have never seen them before, you will usually get flowers the first or second year from your purchase. Even if you are a beginner, though, you really should try growing some from seed, choosing some of the less challenging species as a starter (they may be easier, but they're just as beautiful!). You may see in some older reference books that it takes seven years from seed to bloom ... NOT!!! With the more vigorous species you can frequently get flowers by the third year! If you are new to this genus, it is best to avoid the alpine and desert species at first, as even for the experienced grower these require real dedication even to keep alive, let alone bring to flower.

Soils and Fertilizing

Although *Calochortus* are found in a wide variety of soils, from almost pure sand to the densest clay imaginable, in cultivation it is best to provide a well-aerated, fast-draining medium. The actual specifics of what goes into it are not of critical importance as long as a fairly acid to neutral pH is provided (pH of 5 to 6.5) and drainage is good. I should add that almost all commercial potting mixes have a pH in this range. It is often suggested that sand be added to "improve drainage". This can be a good thing if the sand is washed, i.e. free of dust and fine material, and is of coarse grade. Adding sand that is too fine can ruin the aeration of a potting mix by filling up all the air spaces. Perlite, coarse decomposed granite, lava rock or pumice will all improve commercial potting soil. Adding about one third sand, granite, lava, pumice or Perlite to two thirds potting medium will generally be a good mix. For mature bulbs, I add a pelletized slow-release fertilizer such as Osmocote to the mix, at about a tablespoon or two to a two gallon pot. Although *Calochortus* usually grow in very nutrient poor soils (especially deficient in nitrogen), they LOVE fertilizer, and will grow and bloom much better for it. Since I want my bulbs to mature as quickly as possible and bloom every year (don't we all?), I fertilize with a tomato-type soluble fertilizer every month in addition to the Osmocote. Tomato fertilizer is higher in potassium and phosphorus than general purpose fertilizers, and bulbs love it.

Growing in Containers

Growing *Calochortus* in pots is far preferable to growing them in the ground, since you can control conditions much more closely, and move your pots into a dry area such as a garage during your bulbs' dormancy. The deeper the pot the better, and I would recommend at minimum a two gallon pot, 20 cm wide by 20 cm deep (8in by 8in) With a pot this size you can cram a lot of bulbs in. They don't mind this at all, especially if you fertilize, and the taller species, such as the Mariposas, will look better this way and will also lend support to each other obviating the need for any staking. I generally plant the bulbs about 10 cm (4in) deep, but in hot climates they will often pull themselves down to the bottom of the pot in a couple of seasons. If this happens, repot them in a deeper pot.

If you are growing your *Calochortus* in a greenhouse, or in a climate where light intensity is low, you may find that the taller species do need some support. This has not been a problem for me, but if I had to stake my plants, I would push several twiggy sticks about 30cm (12in) tall into each pot when the flower buds start forming, so that the flower stems could grow through them. This might look like you have pots of small dead shrubs for a while, but surely this is better than your beautiful Mariposas flopping on the ground! In a greenhouse, as the plants develop, I would also keep a fan aimed directly at them for at least a few hours a day to make the stems more sturdy. When you see Mariposas in the wild, growing in exposed conditions without any surrounding grasses to support and buffer them, they always have much shorter and thicker stems.

Watering

The watering requirements will vary greatly from species to species, and will also depend on what kind of climate you live in, so it is difficult to generalize. Again, if you know where your species come from, you can at least make a rough guess as to whether they might receive a lot of rain during their growth cycle (as in Northern California or Oregon) or a little (as in Southern California). Of course, there are always those frustrating exceptions, such as *C. palmeri*, which is a wet grower, although it comes from the arid regions of Southern California's Tehachapi mountains and Transverse Ranges. How is this? Well, this particular species grows naturally in seasonal boggy areas and seeps!

As with most bulbs, it is better to let the pots dry somewhat in between waterings. It is often recommended that watering cease when the first flower buds show some color. This is probably good advice for most of the Mariposas, unless you live in an exceptionally dry climate, in which case a little water will help prolong the flowering period and promote seed set. Alpine species, however, and some species that grow in wet conditions such as *C. uniflorus*, should be kept watered until they have died back.

Hardiness

The majority of *Calochortus* species can take light frosts, even those from Southern California and the coastal regions. Those from the foothill regions of the major mountain ranges of the West can tolerate temperatures down to about 15 deg. F (10 deg. C), at least for short periods of time. ALL of the species I grow (including *C. obispoensis* and *C. catalinae*, both considered to be quite tender) have taken temperatures as low as this with only minor damage to the foliage, but the lowest temperatures they have endured were not sustained over several days. Once again, knowing the region your species come from will assist you in estimating their hardiness.

Growing from Seed

Most *Calochortus* species are extremely easy to grow from seed, and this can be a rewarding and exciting undertaking. Seed of many species is available from a few specialty seed suppliers (see the list of suppliers at the end of this article).

Except for the alpine species, *Calochortus* seed germinates very readily without any kind of special treatment. All except the Mexican species should be sown in the Fall, usually around October, and germination will often be very prompt, generally occurring within one to two months. This would coincide with the onset of the Autumn rains in the natural habitat of most *Calochortus*. In my experience, the Fairy Lantern *Calochortus* species take a little longer to germinate, usually up to three months. There are some species that do need a longer period, such as *C. howellii* and *C. palmeri*, these species emerging much later than the others (often not until mid-spring).

All of the alpine species should also be sown in Autumn, but they will need a cold period to induce germination, which then

occurs in Spring. So, if you live in a mild climate, it is necessary to stratify these seeds in the refrigerator. Just put them in a Ziplock plastic bag with either vermiculite or peat, barely dampened, add a pinch of fungicide such as Captan, and leave them in the refrigerator until they germinate. Check them weekly to see if anything is happening, and as soon as the radicles start emerging, take them out and pot them up. This will take from six weeks to four months, depending upon the species. I have found that if I use vermiculite, it is best to remove the seeds from this material when you pot them. I believe it holds too much moisture at the surface of the pot, and since many of the species that need stratification are also very sensitive to excess moisture, it is better not to dump it in your seed pot along with the seeds.

Mexican species all should be sown in spring, after danger of frost has passed. They really do prefer warmth, so if you live in a cool climate you might need to sow them in a greenhouse or use a propagation mat.

The most important factor in successfully growing these lovely bulbs from seed is to start with a sterile environment to avoid the risk of fungal diseases such as damping-off. Use a sterilized seed starting mix, and add pumice, Perlite or coarse washed sand at about 50% seed mix to 50% sand. If this makes your pots too heavy, it is all right to use a little less sand or grit, or you can just use the light weight Perlite. I use pots that are about 12 cm wide by 13 cm deep (5in by 5-1/2) for small quantities of seed. The depth of the pot is very important, since you will want your seedling bulbs to stay in their original pot for at least two years before potting on into larger ones. I always use a new pot or sterilize my pots by washing them in a 10% bleach solution. If you live in a climate where the humidity is high, or if you sow your seeds in a greenhouse, you may want to use a fungicide to protect your seedlings. Fill the pot, firm the potting medium, sprinkle the seeds thinly over the surface, and then top off with a layer of grit about 1 cm (1/2in) deep. Keep the pots evenly moist until germination occurs, then allow the surface to dry a little between waterings. I am now using woven agricultural fabric that is commonly used to protect agricultural crops over all my seed pots This is called 'fleece' in England, and one brand in this country is Reemay. If your seed pots are outside, this fabric will protect them against birds, cats, weed seeds, light frosts, torrential rain, hail are you convinced? Use the lightest weight available for better

light transmission. It can be held down with clothes pins, since tucking it under small pots can make them very unstable. Even on sunny days, there is very little heat build-up with this fabric.

About a month after your seeds have germinated, start a regular fertilization schedule. This, too, is important, since it will enable your seedlings to achieve more leaf growth, and thereby they will produce larger bulbs by the end of the growing season. This will ensure much better seedling survival and return in the second year. One reason that some bulb seedlings don't return the second year is that they were unable to store enough food in the tiny bulb they produced during their first year of growth to make a comeback. It takes a lot of energy to produce the roots and shoots that emerge when dormancy breaks in the Autumn, and if they don't have that energy stored they can't do it. For seedlings use a soluble tomato-type fertilizer, at about half strength every two weeks, or full strength once a month. You will almost see them grow before your eyes in response to this. Keep this up until the tips of the leaves start browning in late spring, telling you that they are about to enter dormancy. Then dry your seedling bulbs off, and store them in a place that is both dry and safe from rodents. *Calochortus* bulbs are very resistant to desiccation, so, if you store them in their pots, you don't have to worry about keeping them cool.

When your seedling bulbs have grown for two years in their original containers, they will then need to be potted on, using the mix and pot size recommended for mature bulbs. In the third year you are likely to have some flowers from some of the easier *Calochortus*, such as *C. luteus*, *C. venustus*, *C. vestae* and *C. superbus*, while the Fairly Lantern and Cat's Ears can take another year or so.

Sources

So now that you are all excited to get started, where do you get them? Some of the large Dutch Bulb brokers in this country are now selling a few *Calochortus* bulbs, such as *C. luteus* and *C. superbus*. Unfortunately, there are very few suppliers of these bulbs in this country, two small nurseries of native bulbs having recently closed down. There are some suppliers in the U.K., and these are listed below. Happily, there are two excellent sources in the USA for *Calochortus* seed, and one in England. There are usually some species offered on the seed exchange lists of

the various societies, such as the IBS, Alpine Garden Society, Scottish Rock Garden Society and North American Rock Garden Society.

Suppliers

Northwest Native Seed (Ron Ratko)
17595 Vierra Canyon Rd. #172
Prunedale, CA 93907
USA
An extensive list of seed.

Southwestern Native Seeds
P.O. Box 50503
Tucson, AZ 85703
USA
Seed of mostly desert species.

Jim and Jenny Archibald
'Bryn Collen'
Ffostrasol
Llandysul
Wales
UK SA445SB
An extensive list of seed.

Telos Rare Bulbs
P.O. Box 4978
Arcata, CA 95518
USA
Comprehensive list of bulbs.

Paul Christian Rare Plants
P.O. Box 468
Wrexham
UK LL139XR
List of bulbs varies from year to year.

Potterton & Martin
Moortown Road
Nettleton
Caistor, Lincolnshire
England LN7 6HX
A good list of both seed and bulbs.

Border Gateway Bulbs
91 Mitchell Street
Wodonga
Victoria, 3690
Australia
A good list of both bulbs and seed.

Most brokers of Dutch bulbs offer one or two species.

IBS INTERNET FORUM

Weedy Bulbs around the World

More than once the topic of the IBS Forum has been bulbs that can become invasive. Early on, Rachel Saunders made the distinction between plants that appear in disturbed areas and those that colonize undisturbed land and begin to displace the native plants. She termed the first type "weeds" and the second "problem plant" (sometimes referred to as "noxious weeds").

A weed can be an attractive addition to the landscape, perhaps even admired by people who see it. It can even be assumed to be a native plant. Weedy plants may become problem plants even where they do not replace native plants if they are poisonous to livestock and appear on land set aside for grazing.

Certain characteristics influence whether a plant becomes a weed. First, it has to be able to withstand the conditions where it is planted. Cold temperatures, hot temperatures, and too much water at the wrong time or not enough at the right time eliminate many. Second, there must be pollinators present for seed to be set, and the correct weather conditions for this seed to ripen. Alternatively, a plant must be able to reproduce vegetatively. Examples of vegetative reproducers are *Allium vineale* with bulbils in the flower head, *Watsonia meriana* (*bulbillifera*) with aerial cormels, and *Crocasmia x crocosmiiflora* with each corm sending out many underground stolons that produce new plants.

In their home country, there are often predators that keep native species under control. Without these predators, and given a climate to their liking, some plants may increase more than they would at home.

Moving a species that produces many offsets or importing soil can spread a potential weed. Jack Elliott told of a big patch of *Arisarum proboscideum* which was well behaved until it was moved, but created a mass in the new spot and a bigger mass in the bed it came from. Bill Richardson acquired soil from a neighbor, and with it a *Gladiolus* hybrid which continues to come up each year no matter how hard he tries to get rid of it. Not far from him, some large trees were removed when a farmhouse was pulled down. The soil was redistributed along the side of the road, creating a persistent patch of *Ixia campanulata*.

Members have been advised to destroy the soil *Gladiolus tristis* has been planted in to prevent some of the tiny cormlets from making their way to a new area, and never to dump problem plants that have been removed from gardens.

In early January we learned that the USDA was proposing a ban on *Homeria*, a South African irid recently reclassified as *Moraea*, because it could overcrowd native plants and was poisonous to livestock. *Homeria flaccida* and *H. miniata* have been serious problems in Australia, where they have invaded agricultural land, a problem which may have prompted this proposal.

This news started a discussion about which plants were weeds or problem plants around the world, and which plants people found to be weedy in their gardens.

In South Africa, *Lilium formosanum* is found on the road verges in the Eastern Transvaal, but it also is found in grasslands in the Kloof. Other invasive bulbs in Natal are an unidentified *Zephyranthes* or possibly *Habranthus* commonly known as "storm lily", and *Nothoscordum gracile* (syn. *N. fragrans* or *N. inodorum*). Near Cape Town, *Narcissus*, *Leucojum*, and *Alstroemeria ligtu* are spreading near where they were planted but are not invading the natural veld.

In New Zealand, some weedy geophytes are *Allium triquetrum*, *Oxalis pes-caprae*, *Zantedeschia aethiopica*, *Watsonia meriana*, and *Crocasmia x crocosmiiflora*.

Several years ago, John Conran listed 55 imported irids that had naturalized in Australia. He alluded to other families naturalizing as well. He did not say which he considered noxious. Besides the *Homerias*, *Allium triquetrum*, *Oxalis pes-caprae*, *Watsonia meriana*, and *Romulea rosea* have been labeled as problems by forum members.

The *Jepson Manual* lists many geophytes as naturalized in California. Of these *Allium paniculatum*, *A. vineale*, *Nothoscordum gracile*, *Oxalis corniculata* and *O. pes-caprae* are labeled pernicious weeds. In Northern California, *Watsonia meriana* is extending from the roadside verges into natural areas.

Several forum members shared which bulbs had weedy tendencies in their gardens. (See table below.) This prompted a few wistful comments from some people who could not

International Bulb Society Spring 2000 Seed Exchange

On behalf of the membership of the IBS, let me thank all those who made donations to the Seed Exchange. Their generosity enables collectors of geophytic plants to expand their interests and try new species. Members at all levels of experience can learn from participation in the Seed Exchange. At the same time, endangered and uncommon species are preserved and the body of knowledge about the cultivation of these plants is increased.

Dell Sherk, SX director

DONOR CODES

AB-ARG	Alberto Castillo - Argentina
AH-NED	Antoine Hoog - Netherlands
AK-JPN	Atsushi Kashimoto - Japan
AL-UKGB	Alex Lain - England
AN-USA	anonymous - California
BM-GER	Bjorn Malkmus - Germany
BW-USA	Bill Welsh - California
CC-USA	Cathy Craig - California
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GC-ITA	Gianluca Corazza - Italy
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IBS-USA	IBS seed packets - California
JE-UKGB	Jack Elliott - England
JM-USA	Joyce Miller - California
JU-GER	Johannes-Ulrich Urban - Germany
LA-CH	Luis Arriagada - Chile
ST-NZ	Susan Turner - New Zealand
WG-AU	Warren Glover - Australia

NOTE on ordering: You are strongly advised to list alternatives; if we cannot send you the number of selections you pay for, the extra money will be given as a tax-deductible donation to the IBS.

NOTE on Seed List: The number in parentheses which follows the donor code adjacent to the seed description indicates the total number of packets available (i.e. very limited supply)

NOTE on next SX offering: The next seed list offering is anticipated to be included in the December 2000 BULBS.

SPRING 2000 International Bulb Society SEED LIST

s00-085	Agapanthus campanulatus	AK-JPN (1)	s00-039	Geissorhiza tulbaghensis	CH-USA	s00-031	Lilium regale	AL-UKGB
s00-084	Allium aflatunense	AK-JPN (1)	s00-043	Gladiolus carmineus	CH-USA	s00-029	Lilium trumpet hybrids 'Golden Splendor'	AL-UKGB
s00-017	Allium ampeloprasum	BM-GER	s00-102	Gladiolus cunoniuis	AB-ARG	s00-018	Lycoris sanguinea	AB-JPN
s00-054	Allium cernuum	AN-USA	s00-014	Gladiolus italicus	BM-GER	s00-106	Manfreda elongata	AB-ARG
s00-009	Allium giganteum	BM-GER	s00-034	Gladiolus palustris	JU-GER	s00-118	Manfreda sileri	AB-ARG
s00-083	Allium insubricum	AK-JPN (1)	97-002	Gladiolus tristis	CH-USA	s00-124	Narcissus papyraceus	BW-USA
s00-086	Allium paradoxum var. normale	AH-NED	s00-044	Gladiolus tristis	IBS-USA	s00-040	Narcissus serotinus	CH-USA
97-001	Allium schubertii	CH-USA	s00-021	Habranthus robustus	JE-UKGB	s00-123	Narcissus tazetta (Autumn colors strain)	BW-USA
s00-036	Alstroemeria aurantiaca	JU-GER	s00-109	Habranthus robustus	ST-NZ	s00-052	Odontostomum hartwegii	AN-USA
s00-111	Anomalesia cunonia	ST-NZ	97-003	Habranthus robustus	CH-USA	s00-019	Ornithogalum saundersiae	AK-JPN
s00-082	Anomatheca laxa, forma alba	AK-JPN	s00-112	Habranthus robustus	WG-AU	s00-022	Orthrosanthus chimboracensis	JE-UKGB
s00-081	Anomatheca laxa 'Joan Evans'	AK-JPN	s00-028	Habranthus roseus	JE-UKGB	s00-023	Orthrosanthus laxus	JE-UKGB
s00-093	Anomatheca viridis	JM-USA	s00-103	Herbertia lahue amoena	AB-ARG	s00-094	Orthrosanthus polystachyus	JE-UKGB
s00-011	Anthericum ramosum	BM-GER	s00-071	Hesperantha baurii	AK-JPN (1)	s00-066	Paradisea liliastrum	AK-JPN (1)
s00-100	Arisaema flavum	AB-ARG	s00-104	Hexaglottis longifolia	AB-ARG	s00-059	Patersonia glabra	AN-USA
s00-080	Arisaema ringens	AK-JPN	s00-108	Hippeastrum aglaiae	ST-NZ	s00-035	Pelargonium appediculatum	JU-GER
s00-079	Arisaema urashima	AK-JPN	s00-115	Hippeastrum bagnoldi	LA-CH	s00-005	Phaedranassa chloracra	GO-NED
s00-078	Aristea ecklonii	AK-JPN (1)	s00-113	Hippeastrum bicolor	LA-CH	s00-110	Phaedranassa chloracra	ST-NZ
s00-008	Arum maculatum	BM-GER	s00-116	Hippeastrum igneum	LA-CH	s00-030	Polemonium caeruleum	AL-UKGB
s00-122	Belamcanda chinensis (yellow)	AB-ARG	s00-002	Hippeastrum organense compressum	DH-USA	s00-065	Rhodophiala andicola	AK-JPN
s00-076	Bloomeria crocea var. aurea	AK-JPN (1)	s00-114	Hippeastrum sp 'Los Vicos'	LA-CH	s00-117	Rhodophiala ovalleana	LA-CH
s00-075	Calydorea sp	AK-JPN (1)	s00-020	Homeria collina	JE-UKJB	s00-064	Romulea clusiana 'Serotina'	AK-JPN (1)
s00-074	Colchicum longiflorum	AK-JPN (1)	s00-015	Hyacinthoides hispanica	BM-GER	s00-041	Romulea sabulosa	CH-USA
s00-032	Crococsmia 'Lucifer'	JU-GER	s00-010	Iris chrysographes	BM-GER	97-005	Sandersonia aurantiaca	CH-USA
s00-087	Crocus dalmaticus (Petrovac strain)	AH-NED	s00-096	Iris innominata	JM-USA	s00-048	Sandersonia aurantiaca	IBS-USA
s00-088	Crocus malyi	AH-NED	s00-056	Iris longipetala	AN-USA	s00-119	Scilla autumnalis	AB-ARG
s00-089	Crocus versicolor	AH-NED	s00-004	Iris lutescens (dark blue/violet)	GC-ITA	s00-091	Scilla litardieri	AH-NED
s00-073	Cyanella capensis	AK-JPN (1)	s00-003	Iris lutescens (yellow)	GC-ITA	s00-094	Sisyrinchium angustifolium	JM-USA
s00-037	Cyclamen hederifolium 'Album'	CH-USA	s00-099	Iris munzii (Pacific Coast hybrids)	JM-USA	s00-051	Smilacina racemosa	AN-USA
s00-092	Cypella herbertii	AB-ARG	s00-070	Iris orientalis	AK-JPN (1)	s00-053	Smilacina stellata	AN-USA
s00-058	Cypella peruviana	AN-USA	s00-007	Iris pseudacorus	BM-GER	s00-047	Sparaxis tricolor	IBS-USA
s00-033	Dahlia coccinea palmeri	JU-GER	s00-097	Iris purdyi	JM-USA	97-006	Sparaxis tricolor	CH-USA
s00-057	Dichelostemma congestum	AN-USA	s00-012	Iris sibirica	BM-GER	s00-049	Tricyrtis hirta	JM-USA
s00-055	Dichelostemma multiflorum	AN-USA	s00-098	Iris tenax	JM-USA	s00-060	Triteleia laxa	AN-USA
s00-072	Dierama sp (white)	AK-JPN (1)	s00-105	Lachenalia contaminata	AB-ARG	s00-046	Triteleia laxa (Brodiaea laxa)	IBS-USA
s00-120	Diets iridioides	AB-ARG	s00-069	Lachenalia pusilla	AK-JPN (1)	97-007	Tritonia laxa	CH-USA
s00-016	Eremurus stenophyllus	BM-GER	97-004	Lachenalia pustulata	CH-USA	s00-013	Tulipa dasystemon	BM-GER
s00-101	Ferraria crispa	AB-ARG	s00-045	Lachenalia pustulata	IBS-USA	s00-063	Tulipa turkestanica	AK-JPN (1)
s00-025	Freesia laxa (white)	JE-UKGB	s00-068	Lachenalia pustulata	AK-JPN	s00-042	Tulipa turkestanica	CH-USA
s00-027	Fritillaria graeca subsp. thessala	JE-UKGB	s00-001	Leucojum divaricata	DH-USA	s00-062	Veltheimia capensis (dull pink)	AK-JPN (1)
s00-026	Fritillaria pontica	JE-UKGB	s00-067	Lilium amabile	AK-JPN (1)	s00-107	Watsonia borbonica ardernei	AB-ARG
s00-090	Fritillaria pontica	AH-NED	s00-050	Lilium kelloggii	AN-USA	s00-121	xPardancanda norrisii	AB-ARG
s00-038	Geissorhiza corrugata	CH-USA	s00-095	Lilium monadelphum	JM-USA	s00-006	Zephyranthes lindleyana	CC-USA
						s00-061	Zigadenus venenosus	AK-JPN (1)

INSTRUCTIONS

- 1 Seeds will be sent on a first come, first served, basis. Even though we ended up with a good diversity of seeds, many of the selections are in small quantities.
- 2 Please use the form below for ordering. You may order a maximum of 20 packets.
- 3 Cost is \$1.00 US per packet, plus \$1.00 US extra overall to cover shipping.
Example; if you order 17 packets, your total cost will be \$18.00 US.
- 4 Mark up the list on page two to reflect your order and keep the page for your records.
- 5 List the NUMBERS (not names) of your first choices in column A, alternates in Cols B & C.
- 6 Send either US currency (dollars), a check, or Int'l Postal MO in US currency only.
We regret that for the time being we must discontinue the use of credit cards for purchasing seeds from the SX. The amounts are so small that the costs are prohibitive.
- 7 This page is meant to be torn out and mailed in.
On the back of this page remember to put your address in the return address spot, affix a stamp, fold into thirds, seal with a little tape, and mail.

ORDER FORM for IBS Spring 2000 Seed Exchange

(this will be used as your mailing label)

Name _____
Address _____
City _____ State/Province _____
Postal Code _____ Country _____
Email Address _____

Selection No.	Column A	Column B	Column C
1			
2			
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19			
20			

Orders *MUST* be received on or before October 1, 2000

_____ fold _____ fold _____

Return address:



Dell Sherk, Director
IBS Seed Exchange
PO Box 224
Holicong PA 18928 USA

_____ fold _____ fold _____

keep those plants alive, reminiscent of a request several years before to send all weedy bulbs to members in Arizona, who were sure they would not become problems in the desert. One person wrote he was making note of some of the weedy ones in the hope he could use them in challenging garden situations.

As for *Homeria*, most of the people who were growing it had not found it to be spreading. Some people couldn't keep it alive, and others found that it stayed put or was kept under control by snails and slugs. In three situations with a Mediterranean climate (one in France and two in California) and abundant winter water during growth, some species were reported to be spreading. In none of these gardens were they replacing native

plants or endangering livestock.

To ban the entire genus throughout the United States when it would not be a problem plant in most areas seemed a drastic approach. On the other hand, education about which species we should be concerned about, for what reasons, and in what situations, can help all of us to be responsible gardeners. Careful deadheading may help keep a garden plant from spreading, or perhaps it should not be planted at all. James Waddick suggested that instead of dumping weedy species, people send them to the bulb exchange. With a few exceptions, there is probably a gardener some place who would not consider it a weed.

LOCATION	NATURALIZING PLANTS
Australia	<i>Chasmanthe</i> , <i>Freesia laxa</i> (syn. <i>Anomatheca laxa</i> , <i>A. cruenta</i> , <i>Lapeirousia laxa</i>), <i>Gladiolus tristis</i> , <i>Nothoscordum gracile</i> , <i>Romulea rosea</i>
British Columbia	<i>Fritillaria meleagris</i> , <i>Muscari armeniacum</i> , <i>Scilla hyacinthoides</i>
Connecticut	<i>Allium tuberosum</i> , <i>Pinellia ternata</i>
Florida	<i>Oxalis</i> , species unknown
France	<i>Allium ampeloprasum</i> , <i>A. roseum</i> , <i>A. triquetrum</i> , <i>Ipheion uniflorum</i> , <i>Moraea vegeta</i> , <i>Nothoscordum gracile</i> , <i>Oxalis pes-caprae</i> , <i>O. purpurea</i>
New York	<i>Allium senescens</i> , <i>Galanthus</i> ?
Northern California	<i>Chasmanthe floribunda</i> , <i>Dierama pulcherrimum</i> , <i>Freesia alba</i> , <i>Homeria collina</i> , <i>H. flaccida</i> , <i>H. ochroleuca</i> , <i>Ipheion uniflorum</i> , <i>Ixia hybrids</i> , <i>Oxalis purpurea</i> , <i>Sparaxis tricolor</i> , <i>S. bulbifera</i> , and hybrids
Oregon bulb frame	<i>Homeria</i> spp., <i>Leucojum autumnale</i> , <i>Romulea</i> spp., <i>Scilla greillhuberi</i>
Pennsylvania	<i>Convallaria majalis</i> , <i>Galanthus nivalis</i> , <i>Ornithogalum umbellatum</i> , <i>Ranunculus ficaria</i>
Southern California	<i>Amaryllis belladonna</i> , <i>Freesia laxa</i> , <i>Ipheion uniflorum</i> , <i>Iris foetidissima</i> , <i>Muscari armeniacum</i>
United Kingdom	<i>Anemone nemorosa</i> , <i>Chionodoxa</i> , <i>Crocus tommasinianus</i> , <i>Hyacinthoides non-scripta</i> , <i>Muscari neglectum</i> , <i>Nothoscordum gracile</i> , <i>Tropaeolum ciliatum</i>

Contributions from the following IBS Internet Forum members were the inspiration for this article: Rachel Saunders, Bill Richardson, John Ingram, Pat Brooks, Mark Cook, Mary Wise, Brent Dickerson, Cathy Craig, Greg Pettit, Jim Waddick, Jojo Spaxman-Sigurgeirson, Lauw de Jager, Tony Palmer, Will Ashburner, Carolyn Schaffner, Jack Elliott, Dell Sherk, Stephen Vinisky, Marguerite English, Mark Mazer, Geoffrey Burnie, Jane McGary, Tony Avent, Paul Christian, Michael Mace, John Conran

EUROPEAN & ASIATIC FRITILLARIA

In this article I intend to describe the more widely-grown *Fritillaria* species from Europe and Asia, leaving all the exciting American species for a future article by an author more experienced in their cultivation. They are native to a wide range of habitats from the shores of the Mediterranean to the plateaus of Turkey and the mountains of the Caucasus and the Alps. Theoretically at least, their habitat is a clue to their cultivation, and for that reason I propose for the most part to group them according to the conditions in which they thrive in nature.

Geography

The areas in which fritillarias grow can be broadly divided into three, Mediterranean, Continental, and Montane, but it must be remembered that each of these areas blends gradually into the next and that many plants grow in intermediate zones. Typically Mediterranean areas have mild, but not necessarily frost-free, wet winters, and generally hot dry summers with occasional rainfall in some years. In Continental areas the winters are very hard indeed, but may be ameliorated by heavy snow cover, spring and autumn are wet, and summer is hot and dry with little or no rain. In Montane areas winters are cold with variable but usually considerable snow cover, spring and autumn are warmer and usually wet, and summers are warmer and drier but there is usually more rainfall than in the other zones.

The Mediterranean climate therefore resembles that of much of the west coast of N. America, and the Continental climate approaches that of the central and eastern States, but usually has more consistent snow cover.

Cultivation

Do not be put off growing a plant because it comes from the 'wrong' habitat. I have described habitats briefly because they give some basic 'how to grow' guidance, but there are sufficient exceptions to make it worthwhile to try anything in your own garden. For example there are plenty of species from the Anatolian plateau which suffer extremely low temperatures in winter and are always completely dry in summer, but will flourish in a garden in Kent with wet summers and mild winters.

Growing them in pots is generally easy, because those that need it can be given a dry resting season after they have gone dormant in summer until early September in the northern hemisphere.

Good drainage is the most important feature of any compost for growing bulbs in pots. I have usually used a loam-based compost with at least a third of its bulk of grit incorporated, but good results can also be achieved with a peat-based compost as long as it has very good drainage.

In the garden most species grow best in full sun but again good drainage is the most important requirement. A few species, notably from Eastern Asia and N. America, do better in woodland conditions with abundant humus in the soil.

European Species

A few of the easiest

These are a few outstandingly easy species for the garden that are worth considering together, although their native habitats vary.

F. pyrenaica

This is a variable species from the Pyrenees, the most commonly grown form being about 30cm(12in) high with narrow grey-green leaves and large very dark chocolate-coloured 3cm(1 1/4in) long bells with deep yellowish green within. Grown from seed I find there is considerable variation from pale straw-coloured through greenish brown to dark brown. There is an excellent yellow form available occasionally with fine bright yellow bells.



F. meleagris 'Aphrodite'

F. meleagris

The best known and most widely-grown species, cultivated commercially by the million, this is a native meadow plant in the UK, and is the most popular species for naturalizing in grass. It grows and increases even better in flower beds. The type species with its heavily chequered purplish pink bells is among the most beautiful of all, but I think the white variety, usually available nowadays as 'Aphrodite' rather than var. *alba*, is even better, especially if it is grown in the partial shade of a woodland setting.

F. messanensis

A widely-distributed species in Greece, Italy, and N. Africa, this is another easy garden plant for sun or shade. It is a tall rather slender species to 30cm (12in) high with narrow grey-green leaves including a whorl of three above the flowers, which are usually reddish brown with green towards the centre of each segment and brownish tessellation. *F. m.* subsp. *gracilis* (*F. gracilis*) is an equally easy but more slender plant with narrower leaves and less tessellated flowers. I am not convinced that it merits subspecific status as plants of it seem to become less slender after a year or two in the garden.

F. pontica

This species grows in Eastern Greece and in Turkey, thus linking the European with the Middle-Eastern species, but it is such an easy plant to grow that I am including it here. It is a vigorous species usually growing to about 25cm (10in) but it is often taller when growing well. The blue-green leaves are broader than those of the other species described *here* and they form an involucre above the large bell-shaped flowers, which are uniformly unchequered pale green, but often tinged a little with reddish brown, especially towards their tips. Var. *substipitata* from the island of Lesbos is an even more vigorous plant with narrower leaves and with more red on the flowers.

Around the Mediterranean

This group of species may not be quite as easy to grow and increase as the last, but they do well in pots and are well worth trying in the open garden.

F. lusitanica

Closely allied to *F. pyrenaica* this species grows in Spain and Portugal. At one time the Spanish species was separated as *F. hispanica* but the two have now been lumped into one

species varying considerably in size and colouring. It is more slender and delicate-looking than *F. pyrenaica* with smaller and narrower flowers of similar variable colour, most often in shades of green and brown with marked chequering. I have found it quite easy in scree conditions but it is slow to increase.

F. involucrata

This is one of the easiest species to see growing in the wild. A comfortable mornings drive from the beaches of the French Riviera, it can be found on the banks of a road to the north-east of Grasse, with fine colonies of *Iris lutescens* (l. *chamaeiris*) in a multitude of colours growing a few yards away. It has a preference for the partial shade of light deciduous forest, and flowers plentifully there in May. It shows considerable variation, especially in the degree of reddish-brown tessellation of the pale green flowers which is a typical feature. I was able to find several that were plain unmarked green. It is a slender plant with narrow grey-green leaves up the stem and forming an involucre above the flowers.

Considering its habitat with a climate not too unlike that in the UK, I have always been



F. involucrata

surprised that it proves difficult in the open garden. Perhaps hotter summers would suit it better.

F. montana

This is supposed to grow very near the last-mentioned site for *F. involucrata* but a prolonged search there was unsuccessful. Unlike *F. involucrata* it is an excellent garden plant growing up to 50 cm (20 in) high with exceptionally narrow leaves which may be whorled round the upper part of the stem. There are up to three flowers on a stem and they are dark brown with even darker tessellation. In the past it was named *F. nigra*. *F. ruthenica* from the Middle East differs only in having the uppermost leaves extended into tendrils. The two are often confused.

F. graeca

If you visit the Southernmost part of Greece, the Peloponnese, in late March or early April you will be rewarded by the sight of several species, including *F. messanensis* (described above).



F. graeca

F. graeca itself is a small and variable species found over a wide area of southern Greece. Most typically it is a short plant to about 15cm/6in with a few glaucous lanceolate leaves and up to three flowers to a stem. The short broad bells are deep reddish

brown with a striking contrasting light green stripe down the centre of each petal. Plants from Mt. Parnassus are particularly well-marked. Those I have seen in the Peloponnese have been taller with little or no green on them.

F. davisii

This is another rather short species resembling *F. graeca* and growing only on the Mani Peninsula, the central peninsula of the Peloponnese. It differs in having broader deep green leaves almost flat on the ground and flowers with no green striping. Sadly it is suffering severely from the attentions of collectors. This is a tragedy as it is not difficult to grow and increase and should never be collected.

F. conica

Endemic to the Western peninsula of the Peloponnese, it grows in scrub and is becoming increasingly uncommon. It is only about 15cm (6in) or less, with broad dark green basal leaves and solitary deep yellow conical flowers 2cm (3/4in) long. It is a most attractive species and possibly one of the easier yellow-flowered species to grow. It did well in my garden for several years.

F. obliqua

This sadly has become a very rare plant in its habitat in central Greece, not far from Athens, but it is well-established in cultivation both in pots and less frequently in the open garden. It is a most striking species with very glaucous grey-green leaves, broadly lanceolate with one leaf above the pendent flowers which are glossy and almost black. They are often solitary but there may be two or three to a stem.



F. obliqua

Greek Islanders

The many Greek Islands share a similar climate, with hot dry summers and mild wet winters, and have several endemic *Fritillaria* species. None of them are easy garden plants but they have all been grown very successfully in pots.

The easiest of the islands to visit is Euboea (Evia). It is a long narrow island along the east side of the mainland and is readily accessible by a bridge. It is not very popular with tourists but the plant enthusiast can find three endemic

species there in spring. My wife and I went there in late March after spending a very cold ten days in the Peloponnese. This was an ideal time to visit Greece in spite of weather that could politely be called 'mixed'. The rocky hillsides everywhere on the mainland and in Euboea were a mass of flowers, of *Anemone pavonina* and *A. coronaria* in various colours, the small Greek form of *Iris unguicularis* and a wealth of *Ophrys* and other orchid species, in addition to the fritillaries described here.

F. erhartii

This is the most abundant of the three endemic species and is confined to the southerly tip of the island, growing among the rocks only a short distance above the shore. It closely resembles the asiatic species *F. zagrica*, only 5-10cm (2-4in) high, with a pair of broad basal leaves, greyish green in colour, and one or two narrower stem leaves beneath the solitary flowers. These are narrow bells, dark chocolate brown, with a small yellow tip to each reflexed segment. In spite of being locally common in nature it is not widely grown and I have not found it particularly easy.

F. euboica

This was thought at one time to be confined to the central mountains of the island, but by good fortune, having failed to find it under snow in the classical site, we found a few plants almost at sea level in the north of the island. It resembles *F. conica* in size but the leaves are more glaucous and the bell-shaped flowers are not conical but slightly waisted below their tips.

F. rixii

This is a recently described species closely resembling *F. drenovskii*, described below, but with yellow flowers.

F. rhodia

Endemic to the popular island of Rhodes, this is an uncommon species growing to 25cm (10in) high, with very narrow glaucous leaves and solitary slender greenish yellow flowers.

F. rhodokanakis

A native of Hydra, a pleasant morning's boat trip from Piraeus or from Nauplion,

this is one of the most attractive small species. It attains about 10-15cm (4-6in) in height, and has several glaucous leaves, broader at the base than up the stem, and solitary nodding broadly bell-shaped flowers, widely flaring towards the tips of the segments. Typically the flowers are deep chocolate towards the base with a bright yellow outer third. This is an interesting colour combination found in several more easterly species like *F. michaelovskii*. In any population with the typically coloured flowers there will usually be a few which are an even creamy yellow.

F. tuntasia

A native of Kythnos and Serifos this species is widely-grown and quite easy, even in the open garden. It closely resembles *F. obliqua* with its blackish flowers but is generally taller and can have up to five flowers to a stem.

Some of these smaller islands are difficult to visit before the tourist season begins, and I am only familiar with Euboea and Hydra. Other lesser islands would be well worth visiting for their flowers on one of the occasional boats from Athens.

Mountaineers

These species generally grow at moderate altitudes in the Southern European mountains, where there is still some Mediterranean influence. All are easily grown under glass with a summer rest but not with excessive drying. All are worth attempting in the garden as they are likely to have some intermittent summer rainfall in the wild.

F. tubiformis

This is one of a group of species with broad and rather square-shouldered bell-flowers which are very large for the height of the plant. It grows in the Maritime Alps, sometimes at quite low altitudes near the Riviera. It has a few narrow grey-green lanceolate leaves on 10-15cm (4-6in) stems with solitary 5cm (2in) long reddish purple



F. t. var. moggridgei

heavily tessellated flowers. It is a most attractive species, only excelled in beauty by its sub-species *moggridgei* which is identical except in colour, bright yellow with well-marked brown chequering.

F. thessala (F. graeca subsp. thessala)

A native to Northern Greece and surrounding countries, it is one of the easiest species to grow in the garden. It is a more robust plant than *F. graeca* growing to 30cm (12in) high, with glaucous lanceolate leaves up the stem and forming a conspicuous involucre above the flowers. The flowers are large, to 5cm (2in) long, basically green but with reddish brown staining and faint chequering.

F. drenovskii

A native of North Eastern Greece and Bulgaria, this is a beautiful slender species, usually about 15-20cm (6-8in) high with very narrow almost linear grey-green stem leaves and small narrow bells flaring at the mouth. There appear to be two very different forms in cultivation, one of which is a taller and stronger plant with up to three very dark brownish purple flowers to a stem. The other has always been a personal favourite, much smaller with solitary flowers that are paler reddish brown in colour with the golden yellow interior showing as a rim round each narrow segment. They are excellent pot plants and the more vigorous form might do well in the garden.



F. drenovskii

F. gussichiae

(F. graeca subsp. gussichiae)

This is also native to Northern Greece and is similar in size to the last, but differs considerably in having wider stem leaves with no involucre and pale green untessellated flowers, usually with a narrow brown edging to each segment which gives a striped effect. It seems a little less vigorous in the garden.

Summary

In this first article I have described most of the European *Fritillaria* species likely to be obtainable. The more specialised bulb nurseries stock many of them, but the ideal method of building up a collection is to grow them from seed. This will produce a reasonable stock with which to experiment at very little cost. I have made some suggestions as to the easiest to grow, and they are a good starting point for a collection of these fascinating plants.

In the second half of the article I will describe the fritillaries from Asia, which include many other species that will thrive in a wide range of climates.

Further Reading

Comprehensive descriptions of *Fritillaria* species can be found in several general bulb books, some of them sadly out of print but possibly still available from second-hand book sources.

The Smaller Bulbs Brian Mathew Batsford

Bulbs for the Rock Garden Jack Elliott Batsford. These two books cover most species despite the size restriction

Growing Bulbs Martyn Rix, Croom Helm. Excellent on general bulb cultivation

Bulbs Christopher Grey Wilson & Brian Mathew, Collins. Covers European bulbs only, very comprehensively.

Bulbs Roger Phillips & Martyn Rix, Pan. Contains a large number of picture of fritillaries with brief descriptions

The Encyclopaedia of Alpines in two volumes by the Alpine Garden Society, and the RHS Dictionary in four volumes cover the ground well.

The RHS Bulb Book contains all the material on bulbs extracted from the RHS Dictionary

Sources of Bulbs and Seed

The following are useful sources of bulbs and seed of fritillarias including Asiatic and American. Their details are given in a separate column.

Jim & Jenny Archibald SEED
Avon Bulbs
Cambridge Bulbs
Chiltern Seeds, U.K. SEED
Paul Christian
Karmic Exotix Nursery SEED
McClure & Zimmerman
Ron Ratko SEED
Potterton & Martin
Telos Rare Bulbs

Societies with excellent Seed Lists
Alpine Garden Society
AGS Centre, Avon Bank
Pershore, Worcestershire WR10 3JP UK

North American Rock Garden Society
PO Box 67, Millwood, NY 10546, USA

Scottish Rock Garden Club
Subscription Secretary
64 Dickens Lane
Poynton, Cheshire SK12 1NY UK

International Bulb Society
www.bulbsociety.org/

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INTERNATIONAL BULB SOCIETY NEWS

REGIONAL MEETINGS HELD

Bulborama 2000: a time of introductions contributed by Carol Wallace

Many people attended met people who until now were only names in a book or signatures on e-mail. And many met bulbs that were completely unknown to them until they were introduced during the Bulborama programs. Experienced and new enthusiasts alike were introduced to new ways of growing bulbs, and new companions for them in the garden.

Held in a spacious room in the Los Angeles Arboretum, the two-day program featured talks by experts, many accompanied by slides, as well as the opportunity to look over many familiar and unfamiliar bulbs – and later, the chance to bid on some and take them home. There were even free bulbs, there for the taking.

Speakers included Steve Brigham, who spoke mostly on plants that would accompany bulbs in a western garden, drought tolerant and often blooming in summer after the bulbs have gone. Among the plants he recommended were perennial snapdragon, *Nemesia capensis*, 'Texas Buttercup' *Calyophus drummondii*, *Hemiantra pungens*, and *Geranium* 'Frances Grate'. But no bulb enthusiast could refrain from mentioning bulbs, and Steve showed several, including *Nectaroscordum siculum* in full flower.

Cathy Musial spoke next about the bulbs and plants of Australia, some of which she had introduced at the Huntington Botanic Garden. She described her experiences with several *Blandfordia* and *Xanthorrhoea* species, including the tuberous *X. macronema*.

Oxalis enthusiasts especially enjoyed Michael Vassar's talk on many oxalis that he brought back from South Africa years ago and is now growing at home. The audience thoroughly enjoyed the many slides and live plants featured in these talks – some familiar, and some that few attendees had ever seen.

On the second day, Jim Duggan showed a series of spectacular slides of different genera and species of Cape bulbs. Dylan Hannon then showed slides and examples

from his own collection, grouped according to their continents of origin. Hannon's collection, one participant remarked, seemed to consist almost exclusively of truly rare things not offered anywhere else. Some audience members took notes – or tried to – only to find that the plant's scarcity and the unfamiliar names defeated them.

However, on both days people had the chance not only to meet some of these rarities "in the green" but also to bid on them and take them home. Each main speaker's talk was followed by a bulb and plant auction including many of the plants discussed in the presentation. At the same time, outside, some fairly common bulbs went for high prices – showing that what is common to some in the audience is choice and unfamiliar to others. But there were also many bargains to be had – plants whose rarity most bidders apparently failed to appreciate.

Outside there were sales of a range of potted bulbs including crinums, *Haemanthus coccineus*, *H. scadoxus* 'Magnificus', *Hippeastrum papilio*, clivias, *Ornithogalum saundersiae*, *Cyrtanthus purpureus* var. *montanus*, *Veltheimia capensis*, daylilies and so forth – and then there were selections of bulbs that people could simply help themselves to – free!

The program culminated in a special auction of choice and rare bulbs and plants. The offerings included bulbs such as *Paramongaia weberbaueri*, a large number of both hybrid and species crinums, *Eustacea fosteri*, *Brunsvigia josephinae*, *Ferraria*, *Hippeastrum* Cybister, and the rare *Tecophilaea* hybrid of *T. cyanocrocus* var. *violacea* X *T. cyanocrocus* that Charles Hardman made. Many of these went for bargain prices, so those of you who missed this Bulborama may want to keep that in mind when the next IBS members meeting rolls around in Chicago next year.

All in all, attendees went home with garden plans inflated and plant budgets depleted – yet satisfied that their acquisitions included many bargains. New bulb enthusiasts enjoyed the chance to mingle with many well-respected names in the bulb world

and can now go home to plant some of the legendary names in the world of bulbs.

Spring Bulb Fling 2000: Fun and Bulbs for All! *contributed by Jim Shields*

The two days of Spring Bulb Fling were a terrific experience for those in attendance. The group was small, but the quality was high.

We had entrancing bulb travelogues from Alan Meerow and from Harold Koopowitz on South Africa and on South and Central America.

Alan also gave us a detailed picture of the emerging molecular family tree of the many families of bulbs that used to be lumped indiscriminately into the family Liliaceae. Alan's DNA studies are beginning to sort out some relationships that have been confusing in the past. Looking directly at the genes allows one to separate fundamental similarities from superficial resemblances.

John Harris sparked a lively and extended discussion with his talk on rescuing rot-damaged *Hippeastrum* bulbs. Even a bunch of people obsessed with the obscurest bulbs in the world managed to get worked up about the *hippeastrums*.

On Sunday morning, Jack Elliott took us on a tour of hardy bulbs, many in his own back yard. The group also took much pleasure from introducing Jack to the delights of Southern food.

Thad Howard talked about the rain lilies he has grown over the past years. Thad has lost more beautiful miniature flowers than I have even seen. It was a great pleasure to meet him in person, after having corresponded with him off and on for over 20 years. I wish we could talk Thad into going on-line.

There was John Fellers from Alabama, with his pickup truck full of rain lilies and other bulbs for the auction. Dwain Hicks drove in from Austin, Texas, loaded with bulbs. John Marks came over from New Orleans. Mr. and Mrs. John Rountree arrived uncertain about what to expect and left determined to found a local bulb club in the Washington, D.C. area.

Herb Kelly presided over the awarding of two Herbert Medals for 1999 and the two for 2000. Herb has great stories to tell about bulb collectors and bulb collecting. Hearing a couple of bulb anecdotes from Herb will convince you that all of us are crazy.

Dave Lehmillier brought blooming pots of exquisite miniature crinums and *X Crimocharis* for the Flower Show. Dave, by the way, appears to be an exception among bulbophiles in that he is totally sane; his charming wife, Nancy, is no doubt a stabilizing influence.

Indeed, the best part of the meeting was the opportunity to stand around and talk bulbs face to face with so many other passionate bulb growers. I'm sure that in the fog of the first morning back home again, I have omitted some names of folks I was just as delighted to see as those mentioned. I hope they will forgive me and blame it on advancing age and jet travel. I can't wait for May 4, 2001, when we meet in Chicago for more bulb talk!

Regional Meetings: Coming Attractions

The Second Annual IBS Members Meeting, entitled, Bulb Symposium 2001, will be held May 4 - 6, 2001, at the Chicago Botanic Garden, Glencoe, Illinois. Register early! Contact Cathy Craig at Batlette@home.com or call her at (949) 369-8588 for registration and information.

FLOWERS FOR THE INTERNET

By Jim Duggan

Gardening is taking on a new flavor with the increasing use of computers and the Internet. Everyday more information is funneled into the digitized pipe we call the World Wide Web. All sorts of knowledge, from text to photographs, are translated into bits, zeros and ones for dissemination across the planet. An ever-growing number of people send e-mail messages routinely. These messages flash around the world in microseconds, enabling diverse groups to carry on conversations. Our own Bulb Robin is bringing together an amazing collection of gardeners. We share daily experiences on the success and failures of our plants. Problems that were once mysterious are often resolved by the group's collective knowledge. In the past, we relied on specialist books for advice on growing our rare bulbs. Now we share the personal observations of growers from around the world.

Getting Good Photos

All these bits and pieces flowing through the Web give us the opportunity to be better gardeners. Technology allows almost anything to be converted into bits of knowledge for sharing on the Internet. Text is more obvious with the use of e-mail, but photographs can also be converted into bits, zeroes, and ones for the World Wide Web. I have a mail-order business from which I sell South African bulbs. Producing a color catalog is too costly for my small business. Fortunately, the Internet allows me to show photographs of hundreds of flowers for a very nominal cost. Armed with a 35 mm camera, a close-up lens, a scanner, and computer, I have created a virtual catalog of the bulbs I grow.

The first step is to get good photographs of the flowers. I am very much an amateur photographer, but with the advice of friends and much persistence, I now have many good photographs. I use an older, manual Nikon camera outfitted with a set of close-up lens. In addition, I always use a tripod, because holding the camera absolutely still is beyond my capabilities. When taking the photos, I bring the plants into a fiberglass-covered greenhouse.

The fiberglass house allows good diffused light and a windless situation to shoot the



Gladiolus tristis

photographs. I generally work in the early morning, 8 to 10 o'clock, on fairly clear days. This produces the best light for my set-up. If you do shoot outside, avoid midday bright light. I also use a backdrop to provide a uniform setting for the flowers. I've tried several different colors, including black, and have settled on a pale blue. A few colors, such as the pastel blue of *Gladiolus gracilis*, probably would benefit from a different color backdrop, but I use the same one for all.

The camera is always on a tripod. When using slide film, I slightly under-expose the film. For prints, the exposure is normal to slightly overexposed. The tripod becomes very important when the shutter speed is below 125. A setting of 60 seems to give better depth of field, and this slower setting certainly needs the tripod. As always, some photos are better than others, and persistence produces the best photo. I have been taking photographs of the bulbs for some ten years, and still take more shots each year.

Converting Photos to Digital Images

Once the photograph is developed, it is time for the computer to take over. I really like this part of the process. Now I must convert the photos into bits, zeroes, and ones. This is accomplished by the use of a scanner. I use a Hewlett Packard Scanjet 4C. (My computer is a Macintosh, so some of the specific details will differ from a Windows-powered PC.) My scanner first takes a preview scan and then allows you to zoom in on a selection. I can scan several photos at once, then select each photo individually. Normally, I scan only one photo at a time. With this scanner I can choose an automatic setting (determined by the scanner) for brightness and contrast, or I can do it manually. The automatic setting is not always the best; let your own eyes decide what looks better. Once scanned, I save the file in TIFF format. This uses a lot of memory but is a good way to start. Later you can reduce the memory requirement by saving in a different format (such as GIF or JPEG).



Gladiolus alatus



Homeria collina

With the photograph scanned, I then turn to graphics software to spruce up the photo. I use Adobe Photoshop 5.0. The first step in Photoshop is to crop the image. Get rid of unnecessary areas, as these will only eat up memory. While in Photoshop, you can change any part of the photograph; every bit can be manipulated. A blemished blossom can be airbrushed or painted over. The more you use this software, the better you get. After any blemishes are taken care of, I use one of the many filters available to sharpen the image. This really helps give a clear photograph. Finally, the photo is saved into

a different format, one less memory-intensive and more suitable for the Internet. I save my photographs as JPEG formats. You need to add ".jpeg" to the photograph filename so that the Internet software recognizes it properly. In JPEG you can select various levels of quality (the higher quality requires more memory which means longer download time). I select a mid-range level. This is a key point; download time is directly related to the memory size of the photograph. You can sacrifice photograph quality for faster downloading. On the Internet photograph quality is often low anyway, so selecting a lower memory size when saving in Photoshop is best.

Now I can send text and photographs to our friends around the world, and with a little practice and persistence, you can too!



Jim Duggan owns Jim Duggan Flower Nursery, located in Southern California, and specializes in South African bulbs. Jim is currently Head Gardener for Central Garden at JP Getty Museum.

WELL VERSED

by Lisa Flaum

Spring comes, and everyone loves daffodils. The lovely white and yellow flowers are exclamation points to emphasize the end of winter. For some people, though, daffodils are more than a springtime love. There are blooms for fall and winter as well as for spring. There is a large genus to explore, with different shapes and sizes and colors like pink and orange, as well as yellow and white. There are tough plants to grow in grass, tiny gems for rock gardens, and tender beauties that reward greenhouse culture with winter bloom. Here are two perspectives on references for the genus *Narcissus*, one from the newly infatuated Jim Shields and one from longtime worshipper Kathy Andersen.

***Narcissus* Books by Jim Shields**

I have gardened most of my life but have only recently taken an interest in narcissus. One of the first things I do when taking up a new area of interest is to look for good books on the subject. I asked everyone I knew for book recommendations and eventually bought three books on narcissus.

***Daffodils for American Gardens* by Brent and Becky Heath**

This is the book for the daffodil lover. A slim volume with 142 pages and lots of color pictures, it is where I would start if I wanted to grow the showy hybrids. The Heaths have an engaging style. There are nine chapters, covering everything from the anatomy of a daffodil to culture, naturalizing, companion plants, forcing, and even hybridizing. The final section is a veritable catalog of commercial varieties of narcissus for the garden. The great strength of this book is its abundance of color photographs. No, it isn't a coffee table book, being too small in format and far too useful. Nonetheless, it would be perfectly at home on your coffee table. This is a book for gardeners who want a quick overview of the better hybrid daffodils, how to grow them, and even how to show them.

***Narcissus: A Guide to Wild Daffodils* by John W. Blanchard**

This is a book for the specialist. It is probably the definitive work on the species of genus *Narcissus*. The book is composed of fourteen chapters, the first of which discusses the botany and biology of the genus *Narcissus*.

Subsequent chapters cover the standard fare of cultivation, pests, and diseases. Chapter 4 marks a departure from the typical garden book, as it discusses the taxonomic classification of daffodils. Blanchard approximately follows the prior authorities in the field, mainly Webb's *Flora Europaea* and the various works of Professor Fernandes. Blanchard recognizes about 70 species and numerous subspecies. The rest of the book is devoted to the wild species themselves. The strong point of this book is its presentation of details. There are detailed discussions at the subspecies level; for instance, he covers about ten forms of *N. bulbocodium* at the infraspecific level. These chapters are illustrated with some excellent line drawings, which can better illustrate the unique characteristics of particular species than can the usual color photographs. I suppose I have some reservations about the large number of varieties Blanchard recognizes below the species level. Not having seen any of these in the wild, I have no feel for their inherent degree of variation within single populations. My suspicion, not based on clear evidence, is that we have here a lot of horticultural forms or clones that are given undue taxonomic recognition. I would like to see a second look taken at these, in particular at the forms of *N. bulbocodium*.

***Narcissus* by Michael Jefferson-Brown**

Jefferson-Brown has presented an overview of daffodils, starting with the wild species and progressing to a catalog of the show types. Interestingly, he includes hardiness maps in the species chapter. There is the USDA zone map for the US, which we don't always see in books published in the UK. What surprised me more was seeing one for the UK. I usually privately lump all the UK into equivalents of USDA zones 8 or 9, with a touch of zone 7 in the coldest corners of the British Isles. This map breaks the climate in the British Isles into seven zones of plant hardiness. There is even a chapter on hybridizing. He gives the pedigrees of several cultivars as examples. I would love to see more treatments of hybridizing and pedigrees in other books on garden plants. There is a discussion on propagation, from seeds through tissue culture. He makes a good start on how to improve the increase of bulbs in the field. A case in point is the discussion of bulb nutrition. Most garden and plant books babble on about phosphate. Pure folklore! Whether to use phosphate in a fertilizing program depends much more on

the nature of the soil itself than on the plants growing in it. Adding phosphate year after year to perennial plants growing in a clay-based soil is a recipe for eventual trouble. Jefferson-Brown is one of the very few garden writers who refer to actual studies of bulb nutrition. The Dutch have long ago shown that nitrogen and potash are the major nutrients required for good bulb growth as well as for good flower bud initiation and development.

In Conclusion

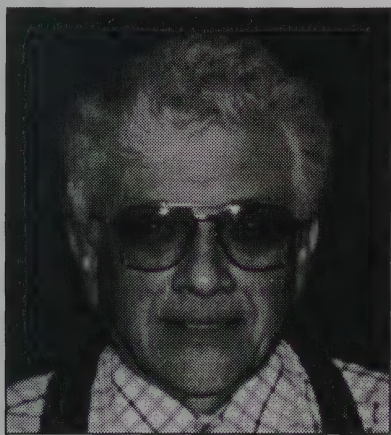
I cannot vouch for the authority of any of these books. I find all three are useful and deserve space on my library shelves. If your interests do not include the esoterica of the wild species, you might not get adequate value from Blanchard's book. If you are a species purist, then you need Blanchard's book and perhaps not the others.

The Books

Daffodils for American Gardens by Brent and Becky Heath; published by Elliott & Clark Publishing, Inc., Washington, D.C. 1995

Narcissus by John W. Blanchard; published by Alpine Garden Society, St. John's, Woking, Surrey, in 1990 and still available from AGS and from the American Daffodil Society.

Narcissus by Michael Jefferson-Brown; published by B.T. Batsford Limited, London, in 1991; now out of print. Search for it on the used book sites of the World Wide Web



Jim Shields

Jim Shields is a retired biochemist who hybridizes daylilies and has grown tender bulbs for 30 years. Now he is trying to grow hardy bulbs!

Born, raised, educated, and still to be found in Indiana.

DAFFODIL BOOKS by Kathy Andersen

Nothing is static in the worlds of botany and horticulture. Nomenclature and classification come and go. Daffodil classification continues to change and expand as hybridizers are able to effect wider crosses between horticultural divisions and more unusual hybrids become available to gardeners. Even household species names have become obsolete, and some widely grown species are now considered to be hybrids of garden origin; e.g., the miniature tazetta narcissus once known as *N. canaliculatus* now goes by the name of 'Canaliculatus'.

Books, too, are soon outdated. Blanchard's book is almost timeless and is still my bible for species. The Heaths' book is an excellent general book for gardeners and contains much useful information and many references, but it was published before the latest RHS changes in classification. There are now 13 different divisions of daffodils, not 12 (or 11, if one is going back before the mid-1990s). Even ways of dealing with pests and diseases change. In two more years, the American Daffodil Society will publish a new *Handbook* dealing with culture and the best daffodils to grow in different parts of the US, as well as taxonomy, history and much more. It will be the ideal reference book for all levels.

At the present time, those interested in daffodils may wish to acquire *The International Daffodil Register and Classified List 1998*, published by the Royal Horticultural Society. It delineates changes and offers a good review of current thinking on botanical classification of the species as well as classification of hybrids. Recently these data plus additions have been made available online at the RHS Web site. *Daffodils and Tulips*, a yearly publication of the RHS, deals with growing and showing daffodils, tulips, and snowdrops. This annual publication reviews growing and showing worldwide and has some choice colored pictures. Current updates to *The International Register and Classified List 1998* are included as removable inserts. The American Daffodil Society also publishes an abbreviated classified list, *Daffodils to Show and Grow*, 1999.

Of course, the best way to learn more about daffodils is to grow as many different cultivars and species as possible and join one of the Daffodil Societies, where you can associate with those who grow them.

Kathy Andersen's biography may be found at the end of her article on pages 30-31.

BEST DAFFODILS FOR YOUR AREA

by Kathy Andersen

You Can Grow Daffs!

As long as you can provide perfect drainage and sun, some member of the genus *Narcissus* will grow in your area. All species of the genus are native to the Mediterranean area and mountains of southern Europe and North Africa. Centuries ago, the Romans took *N. pseudonarcissus* to Britain and the silk traders carried *N. tazetta* to the Orient.

The species have quite specific requirements regarding summer and winter temperatures, summer and winter soil moisture, humus content of the soil, soil pH, aspect, etc. A close approximation to native conditions sometimes enables one to grow difficult species. Hybrids are infinitely more tolerant of diverse growing conditions, but even they have their limits.

You may wish to study *Daffodils for American Gardens* by Brent and Becky Heath [Reviewed elsewhere in this issue. Ed.] This resource can be a great aid in providing many pictures and suggesting specific cultivars for various areas of the country.

Trumpets, poets, and their hybrids

Daffodils from Section *Pseudonarcissus* can be expected to thrive in areas of cold winters and hot summers as long as the soil is kept cool in summer by mulching or overplanting. The parent species are native to the highest mountains, generally snow-covered in winter and cool in summer. The ground is frequently wet in spring due to snowmelt but dries out in late spring and summer.

Trumpets, poets and their hybrids, large and small cups, may be expected to thrive from zone 7 northward. In zones 8 and 9, where winters are seldom cool enough to induce adequate root formation, special measures must be taken to dig and refrigerate the bulbs. In addition, hot moist summer soils will almost always result in basal rot and losses, especially of whites and pinks.

Growers in Northern Florida have had some success with older hybrids such as 'Carlton'. Many doubles that have been derived from trumpets do not thrive in the Deep South. The sudden onset of extreme heat causes the unopened buds to "blast,"



Narcissus bicolor in Pyrenees, one of the precursors to modern daffodils

and the flower literally cooks inside the spathe. Newer doubles seem more successful in this region.

Mediterranean climate hybrids

Hybrids of those species that originated in Mediterranean climates characterized by hot to moderate temperatures and seasonal rainfall can be expected to thrive in Mediterranean climates worldwide. With no undue effort on the part of the grower, tazettas and jonquillas will thrive in southern California. They are also adapted to the Deep South. Some of the hardier ones may be grown as far north as zone 6, but zone 7 is the coldest that many tolerate. In some areas, such as northern Florida and southern California, the small tazetta hybrid 'Canaliculatus' perennializes so rapidly it is considered a weed.

N. 'Castanets'



'Castanets', pictured above, an early-blooming and very fragrant yellow and red tazetta hybrid, is at home in both the northern and southern parts of the United States. In the colder areas, it is best to dig the bulbs after the foliage has died down in early summer and not replant until late in the fall. Such treatment discourages early emergence of foliage susceptible to winter kill.

Fall-blooming *Narcissus*

The fall-blooming *Narcissus* species that are truly Mediterranean grow to perfection in southern California, but only in pots deprived of summer rains in more northerly climates. This is because the onset of fall rains causes almost instantaneous appearance of bloom. Californian hybridizers have used the pollen of one of them, *N. viridiflorus*, to introduce green coloring into certain spring-blooming hybrids. Both 'Canaliculatus' and the fall-blooming species require a hot, dry summer baking in order to induce blooming. In areas with summer rains and without heroic measures, the bulbs either rot or produce no bloom the following season



'Little Becky', barely 5" tall and a strong grower in zones 6 and warmer

Miniatures

Many bulb enthusiasts, especially those with small gardens, are becoming interested in growing miniature daffodils. Some of these bear a superficial resemblance to the species but are far more tolerant of average gardening conditions. Efforts are under way to produce increasingly tinier flowers, some less than 1 inch in diameter, with all parts in perfect proportion. Rod Barwick in Tasmania with the "Mice Series": 'Mickey', 'Minnie' and 'Ferdie', and Bill Dijk in New Zealand with

'Little Becky' and 'Little Emma' are in the forefront of minuteness.

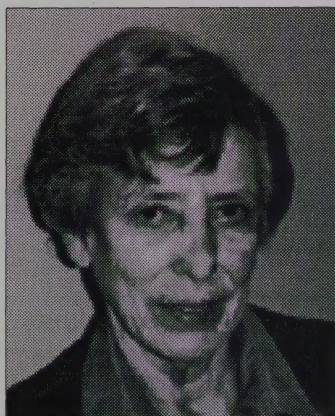
These miniatures may be planted in the ground in plastic berry boxes. The boxes make them easy to find and move. In colder climates, the boxes may be dug up in the fall and relocated to a protected area (cold frame or unheated garage) to escape the most frigid winter weather and later replanted in the garden. Miniatures seem to be more tolerant of summer heat and high humidity than many of the standard daffodils.

Grow, Covet, or Move?

Of course, those of us who live in the northeastern United States lust after the fall-blooming species, the winter bloomers, such as the tender tazettas and bulbocodiums, and the tender spring-blooming tazettas and jonquillas that grow so well in warmer and Mediterranean climates. Those who live in Mediterranean climates are dying to grow the latest pink trumpets, alpine species and poets. *N. triandrus* and its hybrids are a challenge in most areas. The species and its first-generation hybrids are most susceptible to bulb rot when the growing medium is not cool and absolutely dry during the summer. In most areas, heroic methods are necessary to achieve such conditions.

Unless you wish to encounter difficulties and disappointments, be happy with what grows well for you while continuing to experiment with some of the newer cultivars that seem to tolerate a greater range of growing conditions. Real enthusiasts, who wish to grow *all* types of *Narcissus* to perfection with no undue effort will just have to move to the cool Mediterranean climate of Oregon, where everything grows bigger and brighter.

Kathy Andersen is a retired chemist who has specialized in daffodils for many years,



traveling yearly to the Iberian Peninsula and beyond to study the species in their native habitat. Over the years she has built up a collection of more than 3,000 cultivars. She is a past president of the American Daffodil Society.

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In Memory of Sam Caldwell

by Tom W. Dillard

Samuel Yongue Caldwell, one of the pioneering leaders in the world of bulb studies, died in his hometown of Nashville, Tennessee, on February 19, 2000. He will be remembered primarily for his work with *Lycoris*, but his horticultural passions ranged far and wide.

During his college years, Caldwell worked for a variety of horticultural concerns, including the famous William Tricker Waterlily Nursery in Ohio. He also worked as a freelance garden writer and photographer; he took pictures to illustrate the Gilbert Wild Company catalog. When not working, he traveled around the United States searching out interesting gardens and gardeners. He became a close friend of George Pring, the famed superintendent of the Missouri Botanical Garden. Among his many other plant associates were H. H. Hume, Fred Howard, Cecil Houdyshel, and Hamilton Traub.

After being discharged from the Army in 1946, he returned to work in the gardening field. For two years he was the editor and executive director of the American Iris Society, which was at that time headquartered in Nashville.

A tall, handsome man with mild manners and fluid speech, he soon became a widely known lecturer on horticultural topics. In 1949 his neighbor Thomas A. Williams, a man famed as the "Old Dirt Dobber," a gardening advisor on national radio, died, and Caldwell was hired as the new Dobber. During his radio tenure, he published two books on gardening, both illustrated with his own photographs. Later in life, he recalled his radio work as "a hectic but wonderful ten-year period."

In 1964, Caldwell wrote his autobiography for *Plant Life*, and he reminisced about his introduction to bulbous plants: "During my sophomore year at Vanderbilt a lady who lived across the street ... gave me a bulb of the most fascinating flower I had ever seen—something call 'red spiderlily.' Numerous descendants of these original bulbs remain with me today, but the names have been changed, for we now know them as *Lycoris radiata* and *L. squamigera*."

A bachelor who lived with his mother and aunt, Caldwell lavished his time and energy on collecting and breeding *lycoris*. Due to "a

purely accidental occurrence," he came to know a woman living in Nashville who had in her garden a *lycoris* that seemed totally different. First off, it was a beautiful golden color, but more important, it was winter hardy! With great excitement, He reported it to the horticultural world (*Plant Life*, Vol. 18 (1962), p. 78), and it became *L. sperryi*.

In 1962 Caldwell published a detailed "Lycoris Progress Report" in the *American Horticultural Magazine*, a 33-page treatise illustrated with the author's fine photographs. In his simple yet appealing writing style, he used this article to report on his own work with *lycoris*. "A project for the near future is a test plot in which I can line out perhaps 25 bulbs of a kind in adjacent rows, grow them along under uniform conditions for a number of years and watch results. Something good could come from this. Weak strains may be weeded out and possibly extra hardy ones found."

Ultimately, he did introduce a number of hardy hybrids. His hope for "modest little boom" in *lycoris* cultivation never came to pass; however, some of his hybrids are reportedly still in commerce. His hybrids found a far more enthusiastic audience in Japan, where his work was followed avidly by the horticultural press.

In 1957, Dr. Traub named a new *lycoris* species *L. caldwellii*, in honor of his friend's long commitment to the genus. Though honored by the name, Caldwell wrote that "I'd like to be more enthusiastic about a namesake, but the best I can say at this time is that the pale yellow color is very nice, while it lasts."

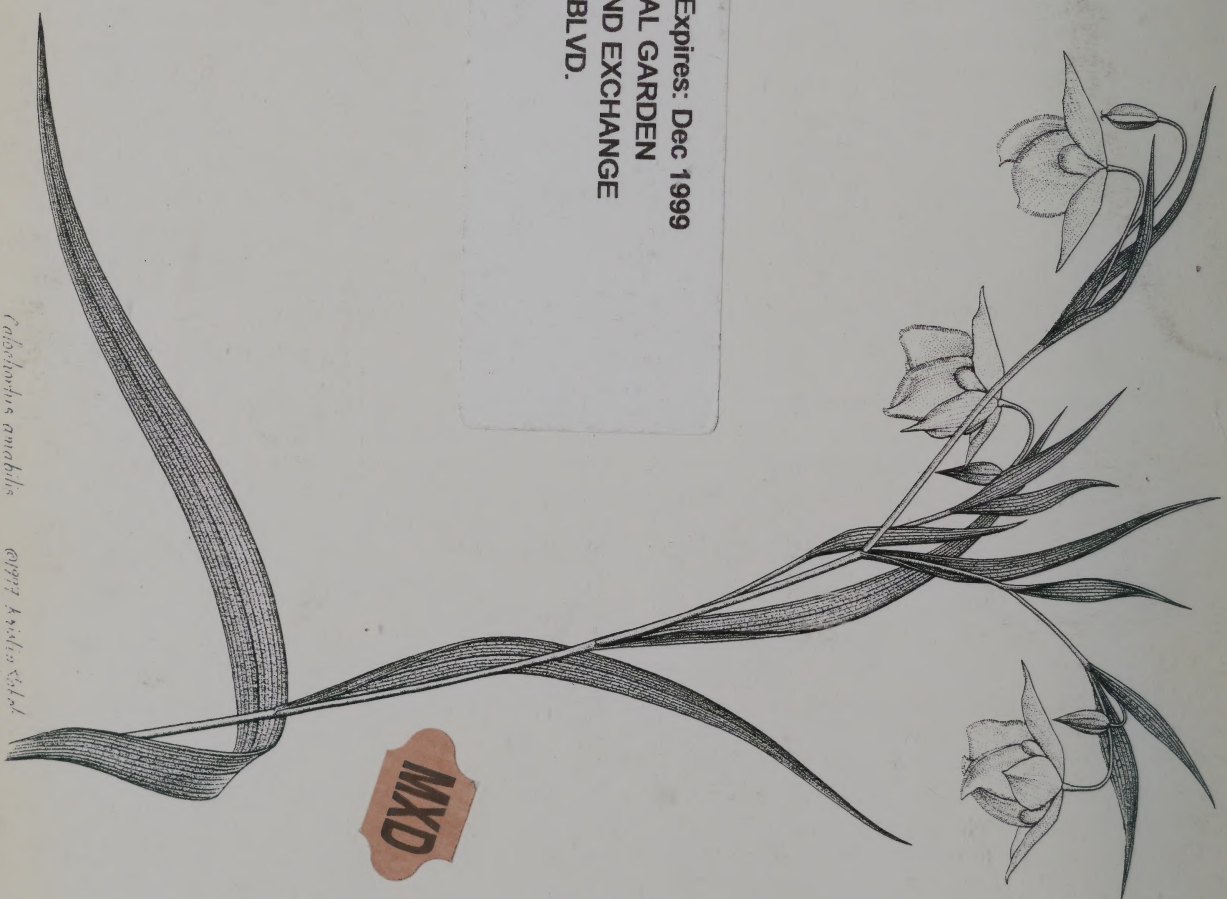
No one has ever written as authoritatively on *lycoris* as Sam Caldwell. His cultural instructions are just as valid today as forty years ago. (See *American Horticultural Magazine*, vol. 41 (April 1962), pp. 84-93.)

When Caldwell grew old, he was forced to leave the family farm and go into a retirement home. Despite declining health and a very poor memory, Sam Caldwell in his ninth decade volunteered to maintain the home's greenhouse. He and his bulbous plants brought beauty into the lives of the residents, providing a bittersweet ending to a long and productive life.

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